Lexicon of Torsion v4.0 (Illustrated and Expanded)

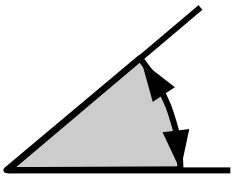
2025-12-22 Dr. G. Innes

Here is a list of words that denote or imply torsion – how things twist, turn, rotate and spin. The concepts and illustrations are defined mainly from a mechanical engineering perspective, but apply to a wide range of real life scenarios. The focus is on action, hence the preponderance of verbs (with the past tenses, adjectives and sometimes nouns presented in brackets). The list can be extended by adding "s" or "es" at the end of many of the words to denote repetition, or the plural, or possibly the continuing verb tense. Selected nouns are illustrated for technical clarity.

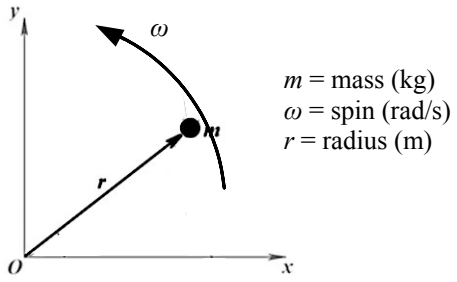
An article explaining details of **hyper-dimensional torsion field physics** is attached after the lexicon.

Aether – the hyperdimensional "superfluid" that permeates all space and physical reality
Amble (ambled, ambling) – to walk at a leisurely pace, involving complex rotational limb movements
Ambulate (ambulated, ambulating, ambulation) – to walk, or the process of walking
Angle – a measure of the wideness of the wedge-shaped space subtended between 2 intersecting lines
Angle (angled, angling) – to change the rotational position or alignment; to fish with rod and tackle
Angular Momentum – capacity for a spinning mass to continue rotating while generating torque
Articulate (articulated, articulating, articulation) – to rotate members about a joint, e.g., an elbow
Axis (*plural:* axes) – imaginary line, about which rotation of particles may occur
Axle – a mechanical part providing an axis about which a wheel, cylinder or other part can rotate

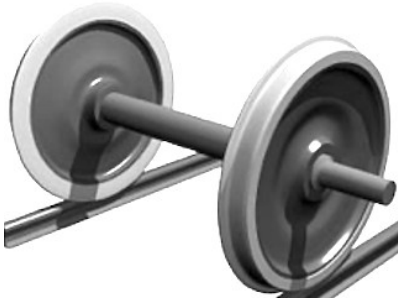
Ball – a spherical object, sometimes hollow, used in ball-and-socket joints, sporting events, etc.
Ball Bearing – a rolling-element device, with solid balls in a raceway, for supporting a rotating load
Bearing – a mechanical element to allow transfer of force between parts in relative motion
Bend – a section of curved or folded material; horizontally curved section of a roadway



An **angle** is subtended by a wedge-shaped space.



Angular momentum of a particle, $L = m\omega r$.



An **axle** provides an axis through wheel centers.

Towing hitch ball

Tow bar socket

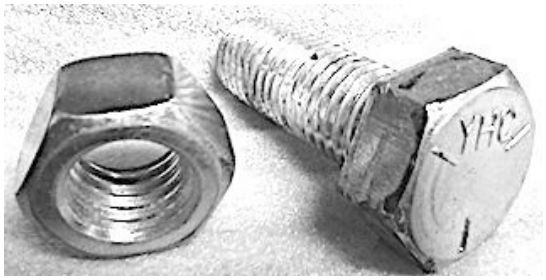
A **ball** is a spherical object, found in joints, etc.

Bend (bent, bending) – to deform locally the straight axis of a piece of material by applying a torque
Billow (billowed, billowing) – to move fluid or smoke in a rolling, or turbulent, and expanding fashion
Bob (bobbed, bobbing) – to undulate or move up and down cyclically
Bobbin – a round core, about which sewing or weaving thread is wound in bobbing fashion
Bolt – a cylindrical threaded fastener, often with a hexagonal head; a wrapped roll of cloth
Bolt (bolted, bolting) – to mate a threaded rotary fastener to a threaded hole or nut
Bore – the diameter of a borehole, e.g., of a piston engine cylinder or cannon barrel
Bore (bored, boring) – to create a large and/or long hole in material by a rotary tool
Bow (bowed, bowing) – to deform into an overall curved shape by action of a torque
Brake – a device to form precisely angled bends in sheet metal, using a lever and hinged straight edge
Brake Disc – a disc-shaped part used to convert rotary energy into heat by friction with a set of pads
Burr – a small rotary tool for minor material removal, featuring a roughened file-like surface

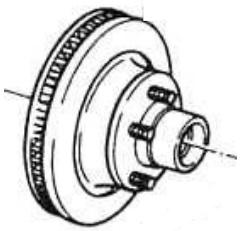
Cable – a twisted bundle of fibres or wires, sometimes with a cylindrical protective sheath
Cam – a smooth, rotating shape for creating cyclic linear motion of a follower, often via sliding contact
Canter (cantered, cantering) – to pendulate 4 legs with 3 footfalls heard per cycle, slower than a gallop
Carousel – a carnival ride, with mechanical horses mounted on a rotating platform (merry-go-round)
Carve (carved, carving) – to remove material using the rotational motion of a tool, as a chisel or knife

A **ball bearing** supports a rotating load.

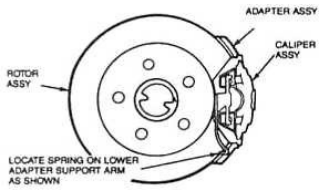
A **bobbin** stores a length of sewing thread.



A **bolt** is a threaded fastener for a matching nut.

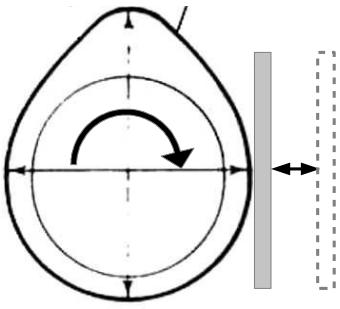


Brake disc

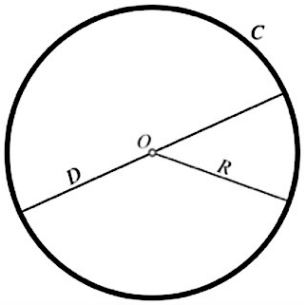


Disc and brake pads

A **brake disc** and pads make heat from friction.



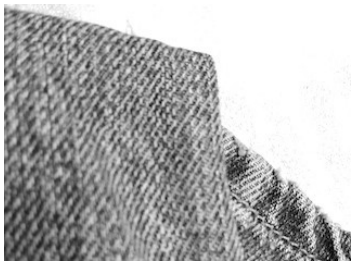
A rotating **cam** cyclically moves a linear follower.



C = circumference
D = diameter
O = center
R = radius

A **circle** is made of points equidistant from center.

Centrifugal – the force causing a spun object to flee away from the axis of rotation
Centrifuge – a rotary machine able to separate liquid or gaseous components using centrifugal action
Centripetal – the force pulling a spun object towards the axis of rotation
Circle – a locus of points, lying in a plane, equidistant from a central point
Circle (circled, circling) – to move in a circle, about a central point
Circulate (circulated, circulating, circulation) – to move in a circular or closed loop
Circumference – the distance of a 360 degree lap around a circle or other closed geometry
Circumscribe (circumscribed, circumscribing) – to surround with a circle
Clockwise (cw) – the curl direction of the left hand fingers, looking directly at the thumb
Cloth – a woven material or textile, made of flexible threads, often available as wrapped bolts
Clutch – a device for interrupting transmission of torque along a drivetrain; a woman's small handbag
Clutch (clutched, clutching) – to hold something tightly with curled fingers
Co-axial – a mounting arrangement where a single spin axis aligns multiple components
Cog – a minor toothed wheel or gear
Coil – a length of rope, etc., wound in successive layers about a central point, often in a plane
Coil (coiled, coiling) – to form a spiral or helical shape; to become coiled, as a snake
Compass (compassed, compassing) – to surround a geometric or map area
Cone – volute of a triangle about an axis
Core – a central object, such as a bobbin, used as a substrate for winding of thread, wire, paper, etc.



Cloth is a woven sheet material.

A **coil** has a spiral-like shape.

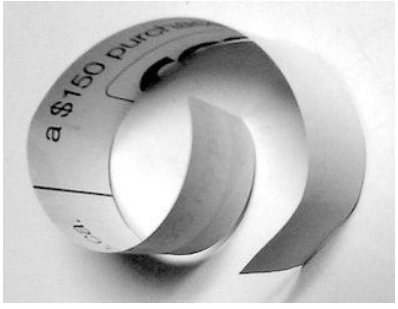
Clockwise (cw)

Counter-clockwise (ccw)

CW and **CCW** are opposite rotational senses.

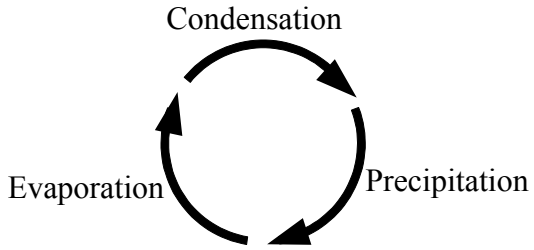
A **crank** enables rotation to be generated.

A **crease** results from local folding of a sheet.



A **curl** forms a curved spiral-like shape.

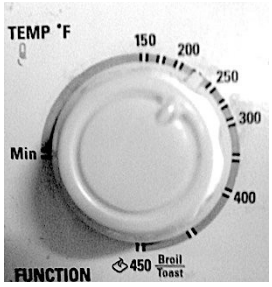
Coriolis – the sideways force that spins hurricanes, due to changing distance from Earth's spin axis
Co-rotate (co-rotated, co-rotating, co-rotation) – to rotate multiple objects in the *same* sense (cw/ccw)
Counter-clockwise (ccw) – the curl direction of the right hand fingers, looking directly at the thumb
Counter-rotate (counter-rotated, counter-rotating, counter-rotation) – to rotate in the *opposite* sense
Crank – a mechanical device featuring an axially offset handle or protrusion for creating rotary motion
Crankshaft – a driveshaft with axially offset portions for converting reciprocating motion into torque
Crease – the residual line or wrinkle in a material after being unfolded; area behind a hockey goal net
Crease (creased, creasing) – to deform material locally due to folding or unfolding action
Curl – a piece of material or hair that is curled, similar to a spiral
Curl (curled, curling) – to form material into a spiral-like shape; a game with sliding rocks on ice
Curve – a locus of points or pathway, often in a plane; a roadway with gradual changing direction
Curve (curved, curving) – to bend or flex away from a straight shape
Cycle – a single period of a regularly repeated motion or sequence of motions, e.g., as a laundry cycle
Cycle (cycled, cycling) – to perform a repeated series of operations or movements; to ride a bicycle
Cyclic – having a regular period of motion or action
Cyclone – a rotating weather system such as a hurricane, typhoon or tornado
Cyclonic – like a rotating fluid mass or vortex
Cylinder – the axial extrusion of a circle, or volute of a rectangle about an axis



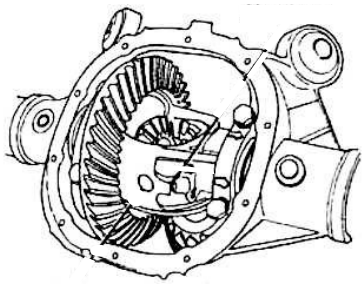
Hydrological (rainwater) cycle

A **cycle** has action repeated over a time period.

A **cylinder** is the extrusion of a circle.



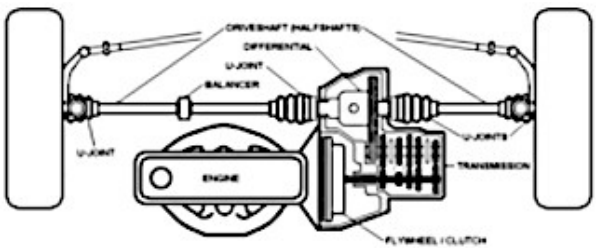
A **dial** has labels indicating rotary position.



A **differential** splits torque between two axles.

Hockey puck

Plastic lid



Front wheel drive car

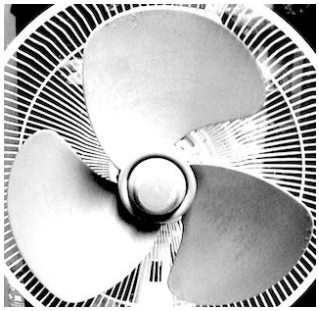
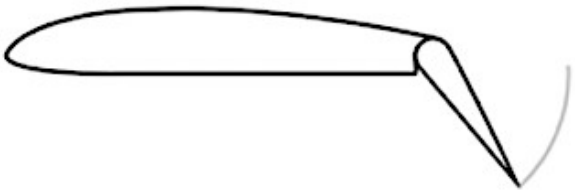
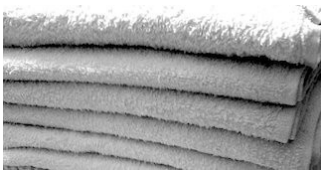
A **disc** is a flattened circular object.

A **drivetrain** controls transmission of torque.

De-orbit (de-orbited, de-orbiting) – to remove from orbit
Dial – a circular calibrated label, often for a mechanical control knob
Dial (dialed, dialing) – to rotate an instrument input, as an analog telephone dialer
Diameter – the distance across a circle, passing through the center
Differential – a device able to drive a pair of axles at slightly different speeds, used in automobiles
Disc – a flattened, circular object or piece of material, typically with no central hole
Doughnut – a toroidal or 3-dimensional disc-like object, featuring a central hole
Drill – an appliance for drilling holes; a military parade exercise, sometimes with pinwheel formations
Drill (drilled, drilling) – to create a small hole in solid material by a rotary tool
Driveshaft – a spinning part, often a cylindrical rod, for transmitting torque between two locations
Drivetrain – an assembly of parts (e.g., clutch, gearbox, driveshaft) to control transmission of torque
Dust Devil – a column of dust raised by tornadic air motion over a dry landscape

Encircle (encircled, encircling) – to enclose a circular area
Encompass (encompassed, encompassing) – to enclose a geometric or map area

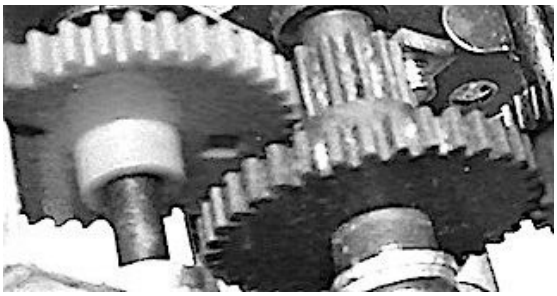
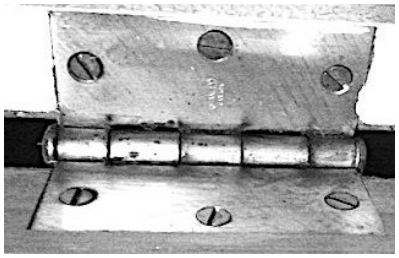
Fan – a bladed device for converting mechanical torque into fluid motion, usually with air
Fan (fanned, fanning) – to create fluid or air motion with rotary or cyclically pivoting elements
Faraday Disc – a magnetized conducting disc, generating electrical potential when spinning
Filament – a thin, flexible linear material, e.g., a hair, nylon fishing line, tungsten light element, etc.
Flap – a pivoting trailing edge extension of an aircraft wing; an overlapping layer of cloth
Flap (flapped, flapping) – to flex or bow an object or material cyclically
Flatten (flattened, flattening) – to change shape towards a planar form
Flex (flexed, flexing) – to cause bending or bowing motion of material due to applied torque
Flick (flicked, flicking) – to release rapidly the finger or thumb, rotating about one or more joints
Fling (flung, flinging) – to release material radially due to spinning
Flip – a horizontal or vertical rotation of a 2D area through the 3rd dimension, as turning a page
Flip (flipped, flipping) – to rotate a 2D area or section up to 180 degrees through the 3rd dimension

	
A **fan** has rotating blades to cause air movement.	A **flap** is a pivoting part of an aircraft wing.
	 Towels Paper
A **flip** action exposes the other side of a coin.	A **fold** is a 180° continuous sheet-material bend.

Flutter (fluttered, fluttering) – to flap continuously, as a bird wing or wind-blown flag
Flywheel – a symmetrical part added to a shaft to increase the angular momentum when rotating
Foil – a thin, highly flexible sheet of metal, such as aluminum
Fold – a highly-bent continuous section of sheet material, such as cloth, forming a double layer
Fold (folded, folding) – to bend material, such as paper, foil or textile, into two or more layers
Foucault Pendulum – a pendulum allowed to swing in two directions, thus detect Earth's rotation
Fulcrum – a pivot point, about which a lever rotates
Furrow – a line or row of ploughed soil; wrinkled facial skin, between the eyes or on the forehead
Fusili – a variety of pasta extrusion with tightly twisted ridges, resembling a classic cannon fuse

Gait – a precise sequence of rotational and other mechanical movements during walking or running
Gallop (galloped, galloping) – to run with four legs, with front and rear pairs in opposing cycles
Gear – a toothed cylindrical part for imparting tangential force, hence torque, to another gear
Gearbox – a protective casing for two or more gears, as part of a drivetrain
Grasp (grasped, grasping) – to hold between the fingers and opposed thumb, both being curled
Grind – one cycle of a grinding operation; a psychologically unappealing repetitive task or job
Grind (ground, grinding) – to remove fine particles from a material, as with a rotating abrasive wheel
Gyrate (gyrated, gyrating, gyration) – to spin circularly, as a gyroscope or as an aerobatic aircraft
Gyrocompass – a navigation instrument indicating fixed direction when spinning, as a compass
Gyroscope – an instrument maintaining a steady inertial reference by spinning, as an artificial horizon

Helical – as orbiting an axis with simultaneous axial motion
Helix – a cylindrical pathway or wire-form with axial spacing between successive loops
Helm – the traditional rudder input for a larger sailing vessel, a wheel with external radial handles
Hinge – a simple joint with two pinned parts to allow limited rotation, e.g., of a door or lid
Hole – a space or opening created within a material, often by a rotary machine tool
Homopolar – an electrical motor or generator with only one component – the rotor (no stator)
Hurricane – a named rotating weather system, sized by wind speed in one of 5 NOAA categories
Hyperdimensional – referring to the 4th dimension, or higher dimensions, of space

	
A **gear** has teeth arranged circumferentially.	A **gyroscope** stays level while spinning.
	
A **helix** is a cylindrical curve with spaced loops.	A **hinge** has two parts, with limited rotation.

Impeller – a bladed, rotating turbine-like device for converting mechanical torque into fluid motion
Inertia – the tendency of mass to maintain its current motion, i.e., translating or rotating
Inscribe (inscribed, inscribing) – to form a circle within a geometric boundary

Jog (jogged, jogging) – to run at a leisurely pace; to perturb gently for aiding memory recall
Joint – the junction of two connected parts or objects, designed to allow articulation
Joystick – the directional control lever found in helicopters, some aircraft and video game controllers

Knead (kneaded, kneading) – to massage with combined rolling and sliding action, as making dough
Knit (knitted, knitting) – to loop a single thread into interlocking rows of stitches using 2 large needles
Knob – a rotary appendage or compact handle, e.g., for operating a threaded rod, electrical switch, etc.
Knot – a tensioned friction joint connecting thread, rope or cable with another rope, a shaft, a ring, etc.
Knot (knotted, knotting) – to tie thread, rope, etc., into a knot

Lathe – a machine tool, with axially sliding offset cutter, to lathe material attached to a rotating spindle
Lathe (lathed, lathing) – to remove material from a spinning mass to form an axially symmetric object
Lean (leaned, leaning) – to rotate away from the vertical, as a body posture, wall orientation, etc.
Lever – a long rigid part, used to multiply force with the aid of a fulcrum
Libration – regular cycles of nodding and wagging, as of the Moon's face seen from Earth
Loop – a highly curved, somewhat circular, length of rope, cable, thread or other wire-like object
Loop (looped, looping) – to orbit without a fixed central point; to follow a highly curved path in 3D
Lope (loped, loping) – to run on four legs with a long, bounding stride, tending to be airborne

Machine – a physical device or appliance for generating and controlling forces and torques
Machine (machined, machining) – to remove solid material continuously, as from metal or wood
March – a distance to be travelled on foot, nominally by marching, as a parade or fundraising exercise
March (marched, marching) – to walk or run in lockstep, as a group or military regiment
Mill – a device with interacting rotary elements to grind material, e.g., making flour, pepper, salt, etc.

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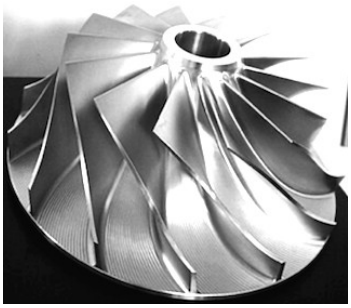
<tr><td>  </td><td>
Hip joint</td></tr>
<tr><td>An impeller converts torque into fluid motion.</td><td>A joint allows connected parts to articulate.</td></tr>
<tr><td>
Doorknob

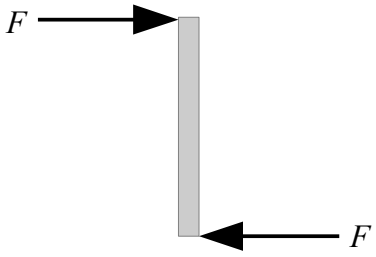
Shower knob</td><td> </td></tr>
<tr><td>A knob is an appendage used to apply rotation.</td><td>A loop is a highly curved shape, often in 3D.</td></tr>
</table>

Mill (milled, milling) – to create a flat surface or generally remove material, by a rotating machine tool
Moment – non-moving torque, product of two opposing forces separated by a perpendicular distance
Monsoon – the rainy phase of a seasonally changing cycle, e.g., near the Indian sub-continent

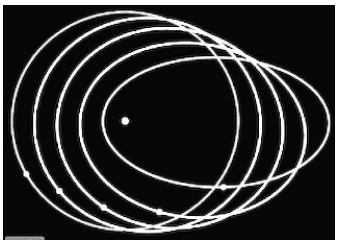
Nod (nodded, nodding) – to rotate forward and backward, as the head and neck about the shoulder
Nutate (nutated, nutating, nutation) – to rotate a spin axis conically at a *faster* speed than the spin rate

Od Field – the distortion of hyperspace surrounding a spinning mass, conferring inertia to other objects
Orbit – a particle path constrained by a central point or body, often due to gravitational attraction
Orbit (orbited, orbiting) – to constrain motion to a path about an external central point or body

Pendulate (pendulated, pendulating, pendulation) – to swing or rotate with cyclic direction changes
Pendulum (*plural:* pendula) – a mass pendulating about a central point
Perpendicular – forming a 90 degree angle (an upright- or right-angle)
Pin – a smooth cylindrical fastener, sometimes with a sharp tip, providing an axis of rotation
Pin (pinned, pinning) – to fix or attach two materials, or connect two objects, by means of a pin
Pinion – a small gear, often used to linearly position a toothed rack
Pinwheel – a toy wind-powered turbine; a marching formation with a rotating line of marchers
Pirouette – a ballet manoeuvre whereby the dancer spins on a single pointed foot
Pitch – the aircraft or ship nose angle measured relative to the horizon; helical loop spacing
Pitch (pitched, pitching) – to point the nose of an aircraft or ship up (positive) or down (negative)
Pivot – a stubby appendage providing a central point for pivoting of an object, e.g., a lever
Pivot (pivoted, pivoting) – to change the angle of orientation in the same plane, e.g., horizontally

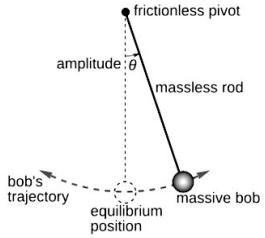


A **moment** is made by 2 offset opposing forces.



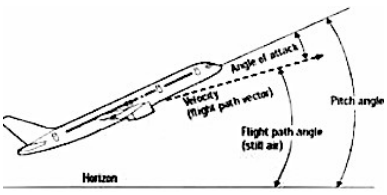
Different elliptical orbits

An **orbit** is a path constrained by a central body.



A **pendulum** swings or rotates cyclically.

A **pinwheel** is a toy wind-driven turbine.



A **pitch** angle is measured relative to the horizon.

Pliers have jaws to grip objects and apply torque.

Plane – a locus of points in 2 dimensions, as the 2-D area defined by perpendicular translation of a line
Plane (planed, planing) – to pass material over a rotating tool to create a longitudinally flat surface
Platonic Solid – one of five perfectly regular 3D geometries, made of 3-, or 4- or 5-sided polygons
Pliers – a pinned pair of levers with jaws for gripping materials or objects and applying torque
Plough – a curved agricultural knife or blade for flipping a row of soil in preparation for seed planting
Precess (precessed, precessing, precession) – to nutate a spin axis *slower* than the spin rate
Pronate (pronated, pronating, pronation) – to rotate laterally the foot about the ankle during walking
Push Steering – impulse based motorcycle steering, initiating front wheel precession + vehicle leaning

Rack and Pinion – a gear and toothed linear mechanism, often used for an automobile steering system
Radial – direction away from the center of a circle, or away from an axis
Radius – the distance from the center to an outer point of a circle, or half the circle diameter
Radius of Gyration – the distance of a particle from the instantaneous center of rotation
Ream (reamed, reaming) – to perform a precision drilling procedure
Recirculate (recirculated, recirculating, recirculation) – to move circularly; to flow in a closed loop
Reel – a round storage frame for film or tape; a length of film or tape wound within a storage reel
Revolution – a 360 degree rotation
Revolve (revolved, revolving) – to spin about an internal axis
Ring – a circular loop of material, often as a machine part or a piece of jewellery
Rod – a long cylindrical piece of material, sometimes with external screw threads
Roil (roiled, roiling) – to disturb the free surface of a liquid in a vorticular or turbulent fashion
Roll – nominally a cylinder, about which material may be wrapped; the shape of a wrapped sheet
Roll (rolled, rolling) – to rotate as a cylinder about its axis, or an aircraft about the fuselage axis
Rotate (rotated, rotating, rotary, rotation) – to move a particle on a path perpendicular to a central point
Rotini – a variety of pasta extrusion, featuring two opposed loosely twisted ridges, similar to *fusili*
Rotor – a spinning machine element, often referring to the moving part of an electric motor
Rotor Blade – a cyclically pivoting airfoil of a helicopter, providing lift and directional thrust
Roulette – a casino game where a ball orbits a revolving wheel, before falling into a numbered pocket
Rout (routed, routing) – to create grooves or recessed faces in material with a rotary machine tool
Rudder – a pivoting steering vane used to change travel direction of a ship, boat or aircraft
Rudder Pedals – the yaw control input of an aircraft
Run (ran, running) – to pendulate 2 or more legs so that all are off the ground at one part of the cycle

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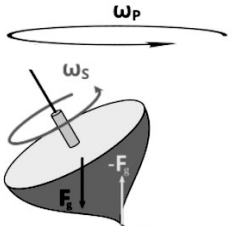
<td> 
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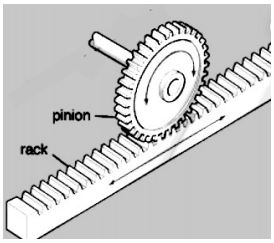
<td> 
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<td>Precession ω_p is slower than the spin speed ω_s.</td>
<td>A rack and pinion makes linear gear motion.</td>
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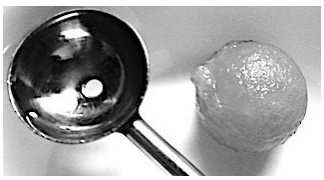
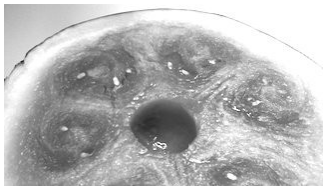
<td> 
Scoop and melon ball

Melon with scooped hole</td>
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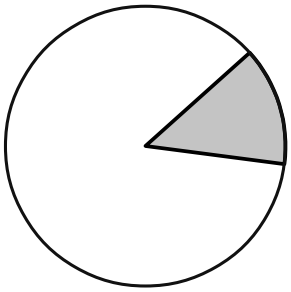
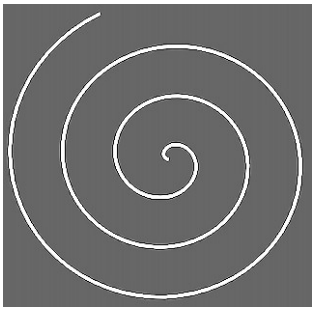
<tr>
<td>A scoop collects material by rotational cup action.</td>
<td>A screw is a sharp-tipped threaded fastener.</td>
</tr>
</table>

Scoop – a cup-like implement for collecting material, such as melon balls, ice cream, flour, etc.
Scoop (scooped, scooping) – to capture material using rotational action of a scoop
Screw – a sharp-tipped threaded fastener primarily used with a wood substrate; a ship or boat propellor
Screw (screwed, screwing) – to operate a threaded rotary fastener, rod, helix or propellor
Sector – part of a circular disc area, ranging from the central point to a section of the outer edge
Sew (sewed, sewing) – to join textile layers together, with thread pulled by a needle using cyclic action
Shaft – a rod-like part used for transmitting torque, or sometimes for storing yarn or sheet material
Sheet – a nearly-planar form, exhibiting material flexibility due to the thin 3rd dimension
Snake (snaked, snaking) – to move by a lateral undulating sliding or swimming action, as a snake
Socket – a receptacle, e.g., to mate with the ball of a ball-and-socket joint, or tool to turn a bolt head
Somersault (somersaulted, somersaulting) – to execute a forward roll or flip of a curled (human) body
Spanner – (British usage) a hand tool for applying torque, also known as a wrench
Sphere – a 3-dimensional locus of points equidistant from a central point, the simple volute of a circle
Spin (spun, spinning) – to move continually about an axis; to manufacture filaments or textile threads

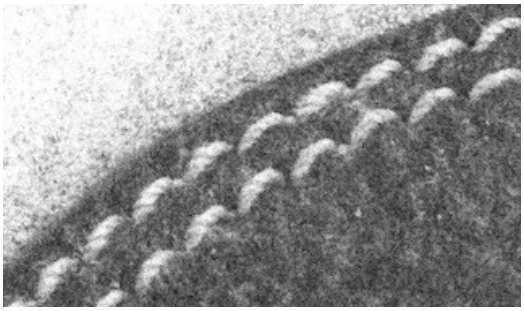


A **sector** is a wedge-shaped part of a disc.

A **spindle** supports a rotating object or material.

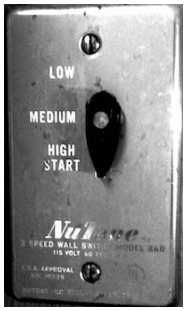


A **spiral** changes radius with rotational angle.



A **stitch** is a basic unit of attachment using thread.

On-Off light switch

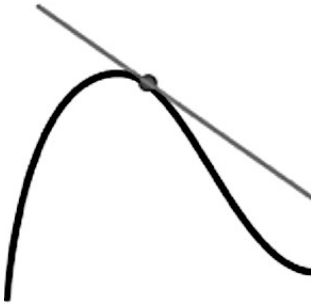
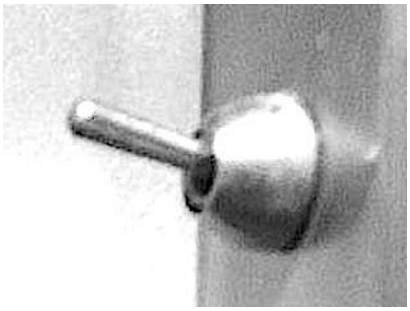


Switch with 4 positions

A **switch** can have two or more rotary positions.

A **swing** seat is suspended by pivoting elements.

Spin-down – the deceleration of a rotating machine part after reducing or shutting off the input power
Spindle – a rotatable cantilevered support part, e.g., holding a lathed object, sewing bobbin, etc.
Spiral – a curve lying in a plane, made by spiralling
Spiral (spiralled, spiralling) – to rotate while also changing the radial distance from the axis
Sprint (sprinted, sprinting) – to run at or near maximum speed, usually for a short time span
Spool – a bobbin or core for storing wound filament, e.g., part of a fishing rod spinner
Steering Wheel – a rotary input for changing vehicle travel direction, as an automobile or speedboat
Stir (stirred, stirring) – to mix fluid ingredients with the looping action of a spoon, whisk, etc.
Stitch – basic unit of attachment using a sewing thread, with an "up" and "down" pair of needle strokes
Stitch (stitched, stitching) – to create stitches, as in joining layers of textile or other sheet materials
Straighten (straightened, straightening) – to reshape into a linear form
Streptate (streptated, streptating, streptation) – to move with higher order rotation, e.g., precession
Stride – the distance between walking or running footfalls; the distance covered by one gait cycle
Swastika Antenna – a printed circuit board (2D) antenna that produces a circularly polarized signal
Sway (swayed, swaying) – to flex periodically relative to the ground or an attached reference point
Sweep (swept, sweeping) – to define an area by pendulum action; to scan a circular area, by radar, etc.
Swerve (swerved, swerving) – to perform a sudden change of direction, as an evasive action
Swing – a playground apparatus, a seat suspended from an overhead support by pivoting elements
Swing (swung, swinging) – to rotate through a limited angle about a central point, e.g., a hammer, etc.
Swipe (swiped, swiping) – to stroke, e.g., a touch screen device with a finger flick, or a card + reader
Swirl (swirled, swirling) – to induce rotary fluid motion by nutation of a container, often with mixing
Switch – an on/off control, sometimes with rotary positions, for an electrical or mechanical circuit
Switch (switched, switching) – to change positions or states of operation, as "on" or "off"
Swivel – a device joining two parts so that one or both can turn freely
Swivel (swivelled, swivelling) – to turn or pivot freely about an axis, as a bar stool or caster wheel
Swoop (swooped, swooping) – to fly over a target with a positive pitch rate, as an attack aircraft

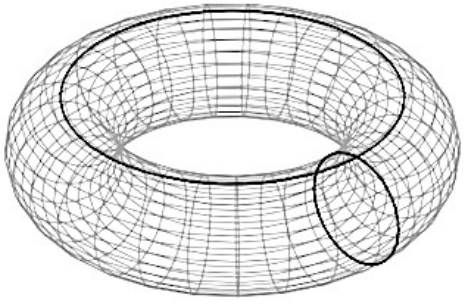
	
A **tangent** touches a curve locally at one point.	A **toggle** is a pivoting control lever.
	Pasta *rotini*
A **toroid** is a doughnut-shaped 3D geometry.	A **twist** is a tangential material distortion.

Tangent – a straight line or plane locally touching a curve at a single point
Teeter-totter – apparatus with one seat at each end of a lever, balancing about a fulcrum (seesaw)
Tetrahedron – the simplest Platonic solid, consisting of four conjoined equilateral triangles in 3D
Thermal – a local rotating air mass powered by rising hot air (updraft) and spun by Coriolis forces
Thread – a raised helical ridge wrapping a cylinder or lining a hole; a textile filament, e.g., cotton
Tie (tied, tying) – to perform a series of looping and/or wrapping operations with thread, rope or cable
Tiller – a lever used to pivot a rudder, often used on small sailing vessels
Tilt (tilted, tilting) – to change an angular orientation or slope, often relative to the horizon or gravity
Toggle – a pivoting control lever, often part of an electrical switch
Toggle (toggled, toggling) – to move between two positions or states, e.g., "on" and "off"
Tornadic – spinning like a tornado or vortex
Tornado – an intense thermal vortex, sized by destructive power (wind speed) in force factors F0 to F5
Toroid – ring or "doughnut" geometry, as the volute of a circle distant from the axis of revolution
Torque – a twisting force, equivalent to applying two opposing perpendicularly separated forces
Torque (torqued, torquing) – to create turning by applied torque; precise tightening of a fastener
Torsion – general twisting, turning, rotation or spinning
Torsion Field – the hyperdimensional distortion of space due to a rotating mass, a.k.a. the od field
Translate (translated, translating, translation) – to move in a linear fashion, without rotation
Transmission – a mechanical device for converting an input torque to a different output torque
Trot (trotted, trotting) – to pendulate four legs quickly, fox-like, with diagonal pairs in opposing cycles
Tumble (tumbled, tumbling) – to roll with a falling or bouncing action, as a tumbleweed or acrobat
Turbine – a bladed, rotating device for converting fluid motion into mechanical torque, as a windmill
Turbulence – the complex 3D vortex pattern of fluid flowing at high speed, i.e. inertia dominated flow
Turn – a 360 degree rotation, as wrapping a wire or filament about a core
Turn (turned, turning) – to effect a two-dimensional change of travel direction; to operate a lathe
Twirl (twirled, twirling) – to rotate an object a few revolutions and then stop (twist + whirl)
Twist – a section of twisted material, such as pasta *rotini*; an unexpected dramatic plot development
Twist (twisted, twisting) – to deform material tangentially about an axis by applying a torque
Typhoon – a hurricane in the Pacific North-West, often near South-East Asia

Undulate (undulated, undulating) – to move up and down, as with a succession of waves

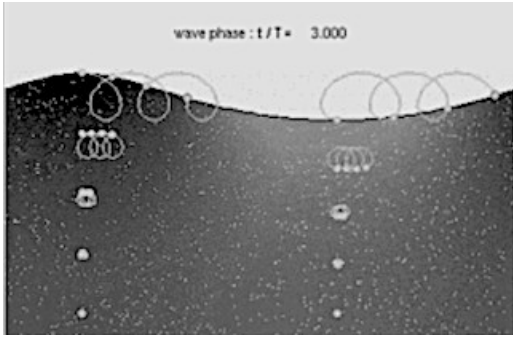
Volute – volume created by rotating a two-dimensional form through the 3rd dimension
Vortex (*plural:* vortices) – fluid moving circularly with a distribution of tangential velocities
Vorticular (vortical) – with spin, like a fluid vortex, or like a mushroom cloud or toroidal vortex

Wag (wagged, wagging) – to pendulate with a side-to-side motion, as a dog's tail
Waddle (waddled, waddling) – to walk like a duck, with side-to-side shifting of body weight
Walk (walked, walking) – to move by pendulating 2 or more legs, always one contacting the ground

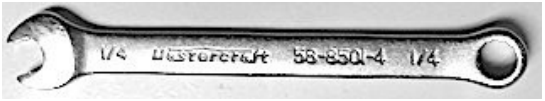
	Plughole vortex
A **volute** is a 3D rotation of a 2D section or area.	A **vortex** is a circular fluid flow pattern.

Warp (warped, warping) – to change the geometry of an object by twisting
Water Spout – a column of water droplets raised by tornadic air motion over a body of water
Wave – a travelling raised mass at a liquid free surface, containing vortex motion
Weave (wove, weaving, woven) – to manufacture cloth by cross-lacing multiple textile threads
Wheel – a cylindrical part used to allow transfer of force and/or torque across a rolling interface
Wheel (wheeled, wheeling) – to rotate or pivot; to move an object mounted on wheels
Whiplash (whiplashed, whiplashing) – to injure by rapid backwards rotary motion of the head and neck
Whirl (whirled, whirling) – to induce orbiting or spinning action
Whirlpool – a large recirculating fluid flow or vortex, usually within a body of water
Whorl – a round weight added to a spindle to aid continuous rotation when twisting yarn or thread
Wiggle (wiggled, wiggling) – to flex periodically, as a fish
Wind (wound, winding) – to wrap thread, wire, foil, textile or coil-spring about a central point or core
Wobble (wobbled, wobbling) – to nutate or precess, i.e., conical motion
Wrap (wrapped, wrapping) – to cover or surround an object with flexible or bendable material layers
Wrench – a lever with a slotted head, or internal polygonal ring, for rotating machine parts or fasteners
Wriggle (wriggled, wriggling) – to travel by flexing and twisting, as in a tightly constrained situation
Wring (wrung, wringing) – to twist a textile or porous material, often to squeeze out trapped liquid
Wrinkle – one of possibly several creases or undulations in a sheet material, such as facial skin
Wrinkle (wrinkled, wrinkling) – to create multiple creases or undulations, in cloth or a sheet material
Writhe (writhed, writhing) – to flex, roll and twist while remaining in place, as a snake or worm

Yarn – a heavy thread or long twisted bundle of fibres, such as wool; a long and exaggerated tale
Yaw – an angle measuring lateral deviation from the direction of travel
Yaw (yawed, yawing) – to reorient an aircraft or ship laterally away from the direction of travel
Yoke – the classic roll and pitch input for an aircraft, a steering wheel with additional push/pull action



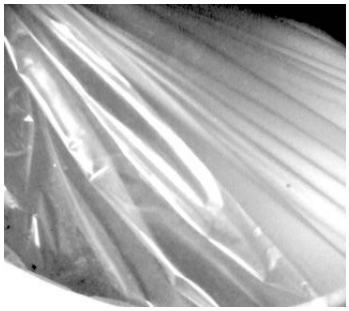
A **wave** is a raised fluid mass with vortex motion.



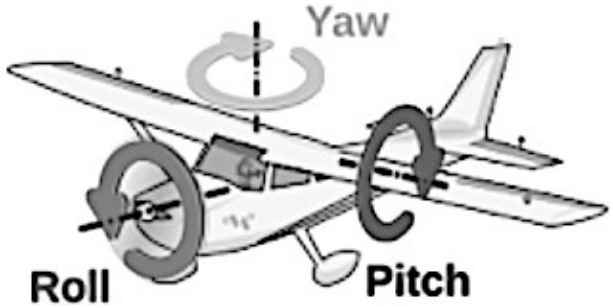
Dual ended wrench

Adjustable wrench

A **wrench** is a specialized lever to effect rotation.



A **wrinkle** is a raised deviation from a flat sheet.



A **yaw** angle measures lateral orientation.

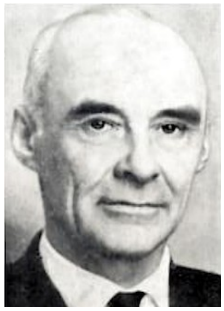
The Torsion Field

Dr. G. Innes

22 December 2025

"One day man will connect his apparatus to the very wheelwork of the universe... and the very forces that motivate the planets in their orbits and cause them to rotate will rotate his own machinery" Nikola Tesla

This article attempts to convey a brief overview of torsion field physics from the perspectives of four very different workers in the subject area. These individuals are Bruce DePalma, Richard Hoagland, John Hutchison and Nikolai Kozyrev. Passing mention is made of other contributors.



Left to right: Bruce E. DePalma, Richard C. Hoagland, John K. Hutchison, Nikolai A. Kozyrev.

Introduction to Experiments

The experiments reported below are viewed mainly from a mechanical engineering perspective, but also include some astronomical observations related to torsion field physics. A list of references and data sources appears at the end of this article. These are denoted within the text by a superscript format, e.g., [a56] means page 56 of reference "a"; [v#17] means item #17 of reference "v".

In classical kinematics, there are just two modes of motion: translation and rotation. For centuries these modes have been accessible to experimentalists, including Issac Newton, who formulated such concepts as acceleration due to gravity (the falling apple experiment).

In the twentieth century, one more mode of motion was investigated: streptation. The word stems from the Greek *streptos*, meaning twisting[a56][a81]. It is a higher order rotation, and includes gyroscopic precession and nutation, Fig. 1. With 19th and 20th century technical advances, such as the electric motor, photography with stroboscopic lighting and availability of other electronic instruments, it became practical to study high-speed rotation and streptation.

DePalma's Research

In the late 1960s, Massachusetts Institute of Technology (MIT) researcher Bruce DePalma noted that gyroscopes exhibited anomalous forces when subjected to forced precession (streptation). Classical analysis could not explain those forces, so he performed a number of experiments to find out why. Some included simple mechanical flywheels or gyroscopes, while others introduced magnetism[a15] and electrical circuits[a37].

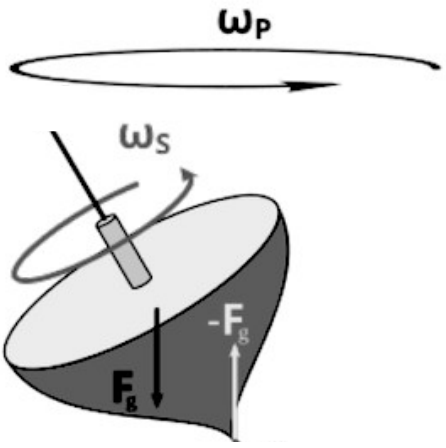


Fig. 1 Precession spin rate ω_p is slower than the gyroscope spin speed ω_s. Nutation ω_n is faster than ω_s.

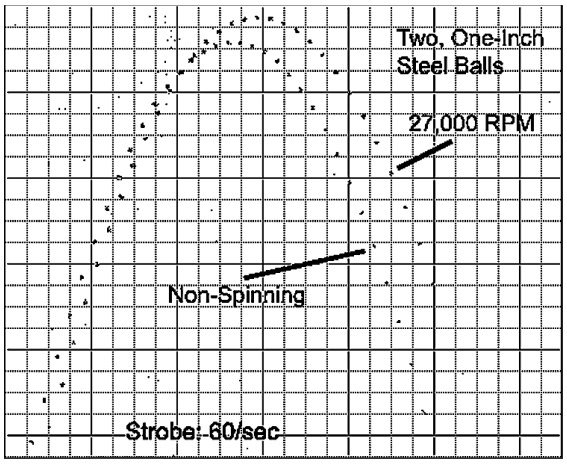


Fig. 2 The spinning ball experiment showed that high-speed rotation affects ballistic motion.

Spinning Ball Experiment

In 1972, a spinning ball experiment revealed that fast-rotating objects behaved differently from non-rotating control objects[a22-28]. DePalma launched two steel balls into the air, one rotating at 27,000 rpm and the other at zero rpm. The stroboscopic photograph recording the event[b][m 156], Fig. 2, showed that the non-rotating ball followed the classically predicted path for a ballistic object, while the spinning ball rose higher and fell faster. Newtonian physics cannot explain the apparent gravity-defying behaviour of spinning.

This result was so startling that comparison was made with the 1590 falling rock experiment of Galileo[a9,94], the results of which defied the physics predictions of his day, Fig. 3. Only after 5 years of reflecting on possible mechanisms behind the spinning ball behaviour did DePalma publish the results[a26,44]. Meanwhile, he performed other experiments with flywheels to develop a theory of what must be happening to alter the physics of a spinning object.

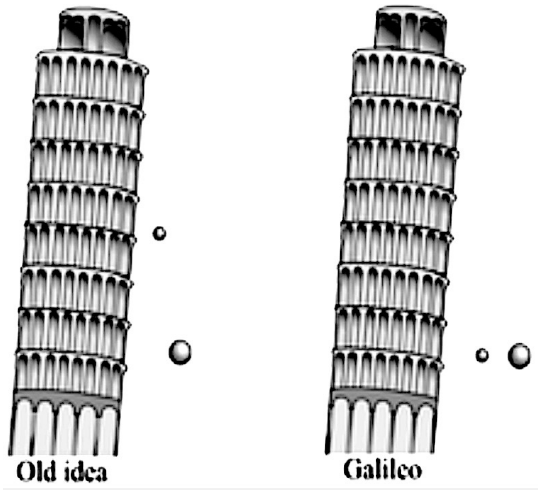


Fig. 3 The falling rock experiment of Galileo showed the fall time was equal for all rock sizes.

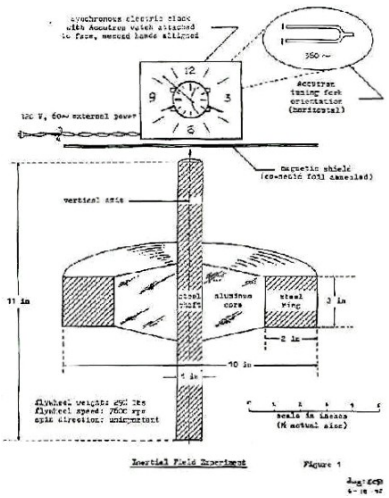


Fig. 4 The Accutron experiment found a flywheel torsion field affected time measurements.

Torsion Field Theory

The theory, developed by DePalma over more than 2 decades of continuing re-evaluation, posited a previously unknown inertial field – termed the od (odd) field[a9,44], or spin field, or torsion field. By analogy with a magnetic field or gravitational field, it may be understood as a distortion of the Primordial Energy Field, or aether, that affects the inertia of objects immersed within it[a10,35,36]. The faster the spin and the bigger the flywheel, the more powerful is the torsion field generated.

As a related concept, torsion energy has sometimes been referred to as “space energy” or “time energy”, which is considered to flow through the aether or hyperspace. DePalma postulated that it flows through a rotating object because it has accumulated rotational quanta, Ro[a27,28], thus connecting the energy release with quantum mechanics concepts. Other terms have also been published, such as "quantum vacuum flux" or "zero point energy". It may be accessed by mechanically stressing a material through rapid rotation and streptation. The greater the rotational stress, the more inertia and energy are released[a52] into 3-dimensional (3D) reality.

In classical mechanics, the stress from simple spinning of a material body, such as a flywheel, is proportional to centripetal acceleration α:

$$\alpha = \omega_s^2 r \qquad [1]$$

and the force $F = m\alpha$ [2]

where ω_s is the angular spinning rate of the object (in radians per second), r is the spin radius and m the mass. Since the material stress (force per unit area) releases torsion energy proportionally, Equation [1] explains why DePalma found the torsion field strength varies with the flywheel radius and the spin speed squared. Eqn [2] explains why it is proportional to flywheel mass.

With the addition of a magnetic field coinciding with the flywheel, an electrical potential is realized between the spinning flywheel axis and rim. This effect was first observed by English scientist Michael Faraday in 1831[a88,89] and provides a basic operating principle for several free energy devices, which draw power from the “vacuum” or hyperspace.

Local interaction with the torsion field may be characterized as an increase in the inertia or slowing down of electrical processes[a95]. Specific experiments supporting these theoretical claims are summarized below.

Accutron Experiment

Dynamic test objects placed above a spinning flywheel axis appeared to gain inertia and those placed near the flywheel plane of rotation, or equator, apparently lost inertia, Fig. 4. DePalma measured the effect by means of two clocks – an Accutron wristwatch and a 60 Hz mains-powered electric clock, used as the reference timepiece[a44].

The heart of the Accutron used in the experiment is a miniature tuning fork operating at 360 Hz. Note that the tips of a tuning fork undergo minute rotational motions, making it susceptible to a torsion field. Changes in the inertia of the tuning fork tines affect the frequency of vibration.

The watch was designed to keep time to within 1 minute per month (2 seconds per day, 0.33 seconds per 4 hours). Prior to the experiment, DePalma found the Accutron gained 0.25 seconds in 4 hours. When placed over the magnetically shielded flywheel axis, rotating at 7600 rpm, it lost 0.9 seconds in

just 17 minutes. An opposite effect[a14] was observed with the wristwatch placed near the flywheel equator (plane of rotation).

DePalma made 3 observations regarding torsion field strength[a45]. Consistent with Eqns [1] and [2], the effects of spinning are, roughly:

1) proportional to flywheel mass *m*
2) proportional to flywheel radius *r*
3) proportional to spin rate squared ω_s^2

A portable version of this Accutron instrumentation was built by Richard C. Hoagland in 2003 and used to record celestial torsion field activity during eclipses. Various ancient sacred sites were also investigated and found to contain geometric structures, pyramids, etc., that amplify or modulate the background torsion field. Details are presented in a later section of this article.

FM Radio Experiment and Kozyrev's Resistor

The Accutron experiment was modified to use an FM radio receiver as the torsion field sensor[c], Fig. 5. When placed over the flywheel axis, the tuning band of the receiver was measurably shifted. This showed the torsion field can affect the characteristics of solid-state electronic components. In particular, the frequency of the electrical resonance circuit (oscillator) of the tuner was lowered when in the vicinity of the torsion field[a23].

From the independent research of Nikolai Kozyrev, the resistance of a 100,000 Ohm metal film resistor measurably changed when subjected to a torsion field. Details are presented in a later section.

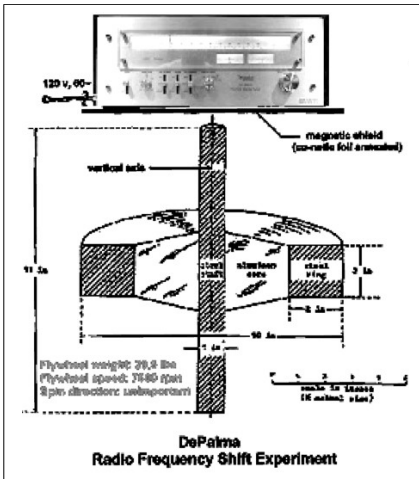


Fig. 5 The torsion field shifted the FM receiver's tuning band.

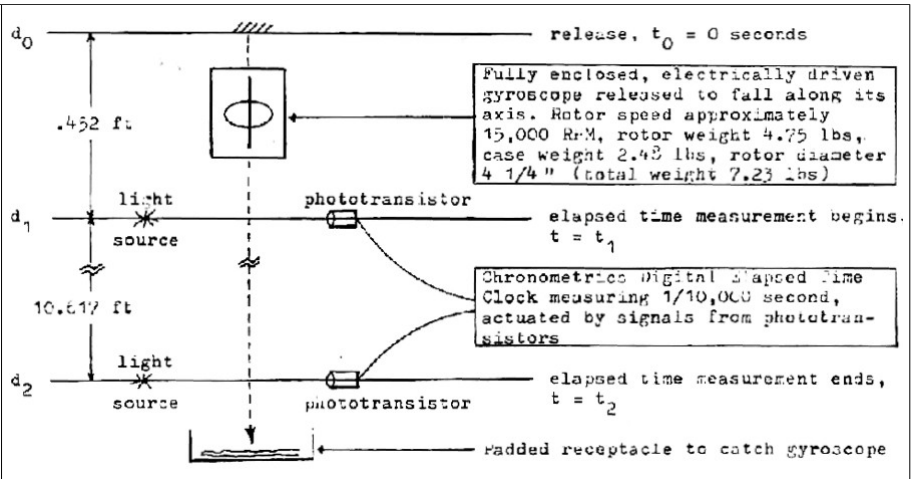

release, t0 = 0 seconds
Fully enclosed, electrically driven gyroscope released to fall along its axis. Rotor speed approximately 15,000 RPM, rotor weight 4.75 lbs, case weight 2.48 lbs, rotor diameter 4 1/4" (total weight 7.23 lbs)
.452 ft
light source
phototransistor
elapsed time measurement begins. t = t1
Chronometric Digital Elapsed Time Clock measuring 1/10,000 second, actuated by signals from phototransistors
10.617 ft
light source
phototransistor
elapsed time measurement ends, t = t2
Padded receptacle to catch gyroscope

Fig. 6 The enclosed-gyro drop experiment showed a measurable reduction in fall time when spinning.

Gyro Drop Experiment

An experiment was performed by DePalma using a mechanism to drop two 1-inch ball bearings over a 6 foot (1.8 m) distance, with one spinning and the other non-rotating[a9]. The experiment was reproduced by researchers Gerber, Merritt and Delvers with similar results[a145-148], Fig. 6. A 4.75 pound (2.15 kg) flywheel, spun at 15,000 rpm, housed in a 2.48 pound (1.13 kg) enclosure (total 7.23 pounds, 3.28 kg) could reduce the fall time by an average of 10.6 milliseconds (0.16%) over a 10.617 foot

(3.236 m) distance, compared with the non-rotating case. The enclosure eliminated differences in air drag that might occur for an unprotected gyro.

This simulated the falling portion of the spinning ball experiment, leading to the conclusion that energy drawn from the aether is added to the existing motion of the object, regardless of travel direction[a28]. It also indicated that simple spinning alone is not sufficient to cause apparent anti-gravity behaviour, but must include some extra motion such as translation, streptation or vibration[v13].

Pendulum Experiments

DePalma made pendula with in-built gyroscopes[a22,27,94], likely as a classical "Newton's Cradle" pendulum-impactor arrangement, Fig. 7. When a pendulum had rotating mass, there was anomalous motion indicating the spinning gyroscope had increased inertia:

1) Pendula utilizing rotating bob weights swing non-sinusoidally.
2) The period is increased over those of pendula with non-rotating bobs.
3) If a rotating object is collided with an identical non-rotating one, the non-rotating object is rebounded a *greater* distance than if struck with the same identical object non-rotating.
4) A rotating object struck by an identical non-rotating object rebounds *less* than it would had it not been rotating[d].

Fig. 7 Pendula in a Newton's Cradle arrangement.

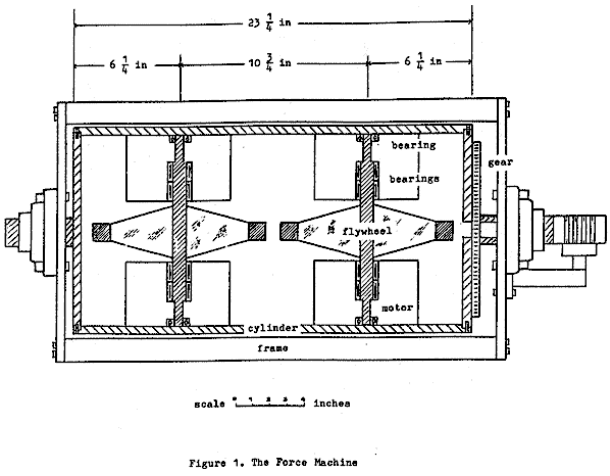


Figure 1. The Force Machine

Fig. 8 Flywheels in the Linear Force Machine.

Linear Force Machine

The Linear Force Machine (LFM) is a combination of two counter-rotating gyroscopes with axles parallel and rotors co-planar[a9,77], Fig. 8. Constructed by DePalma in 1971, the total weight of the apparatus was 276 lbs (125 kg)[a49]. The "active" mass at the rim of each flywheel was 10 lbs (4.5 kg). The assembly was suspended from a spring scale and the gyroscopes driven counter-rotating at 7600 rpm, cancelling out the usual gyroscopic effects. Under these conditions, the support cylinder was driven at 4 revolutions per second (240 rpm) to precess the gyros. A consistent set of experiments repeatably showed 4 - 6 lbs. (1.8 - 2.7 kg) of weight loss.

Since there was no discernible object providing reaction, DePalma posited that space itself provided the reaction by means of the streptating pair of flywheels, hence the machine was termed a "space drive"[a10,82].

Further investigation, using a one-way ratchet mechanism to generate alternating precessing and non-precessing cases, Fig. 9, showed highly amplified inertial effects[a80], Fig. 10. With a smaller version of the apparatus mounted on a wheeled cart, DePalma was able to propel himself across the floor with the pulsating thrust[a10]. The effect was achieved at the cost of high internal stresses on the mechanism, which suffered fracture of a steel shaft when the precession rate exceeded 4 rps. The theory posited that these stresses mirrored the distortion of space, enabling the thrust to be developed.

A formula in terms of an "od number" N_{od} was developed by DePalma to describe the increased inertia relative to the non-rotating (gravitational, or resting) case:

$$N_{od} = (\text{inertial mass})/(\text{gravitational mass})$$
$$N_{od}\,(\text{precession}) = K\omega_s^2\omega_p^2 + 1 \qquad [3]$$

where ω_s = gyro angular velocity, ω_p = angular velocity of gyro precession and K is a geometrical and physical constant[a77,78][a80 caption "B"].

DePalma was able to obtain numbers on the order of several hundred, say, $N_{od} \approx 300$. Considering just the 20 pounds of flywheel mass, the weight loss was about 6/20 = 0.3, or 30 percent. This implies possible levitation or hovering if

$$N_{od} \approx 300/0.3 = 1{,}000 \qquad [4]$$

can be achieved. If considering the full 276 pound apparatus, the resulting weight loss was about 2.2 percent and levitation would possibly require $N_{od} \approx 13{,}800$.

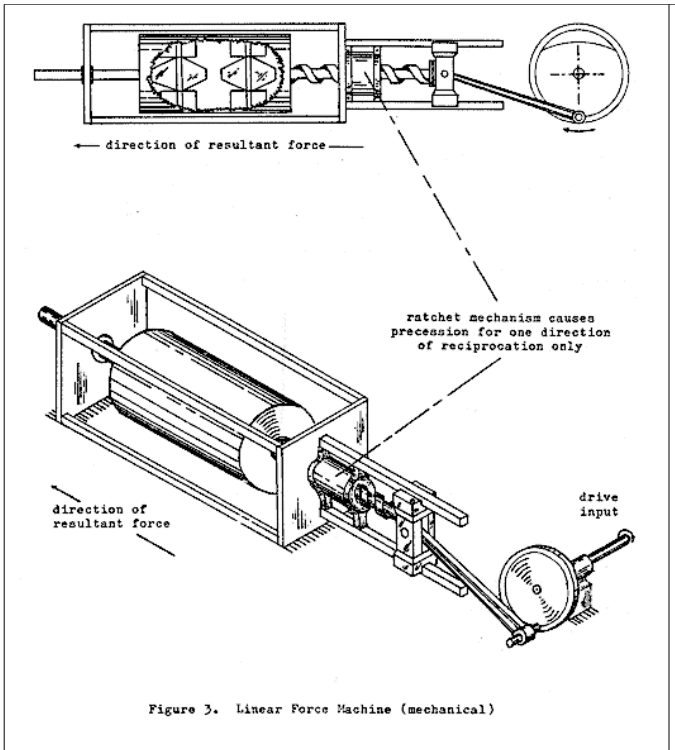

direction of resultant force
ratchet mechanism causes precession for one direction of reciprocation only
direction of resultant force
drive input

Figure 3. Linear Force Machine (mechanical)

Fig. 9 Mechanics of the ratcheted LFM.

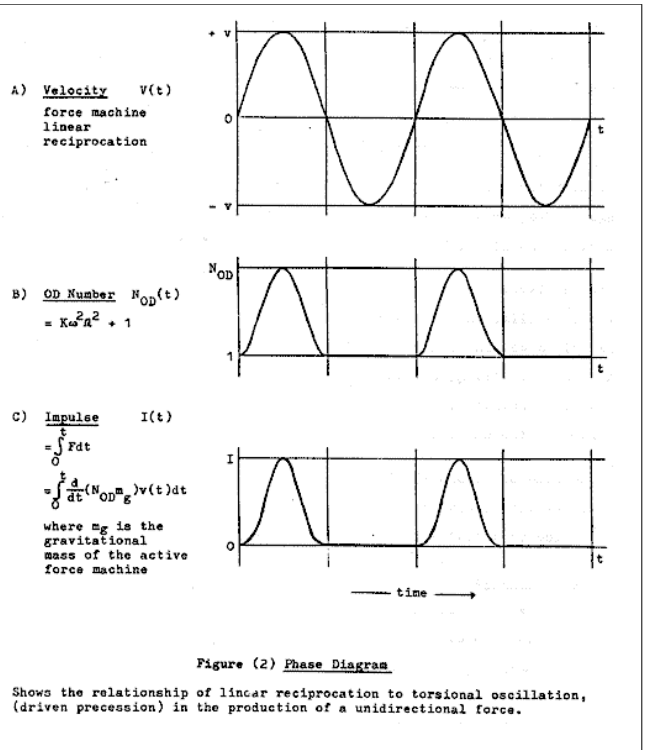


Figure (2) Phase Diagram

Shows the relationship of linear reciprocation to torsional oscillation, (driven precession) in the production of a unidirectional force.

Fig. 10 Behaviour of the ratcheted LFM.

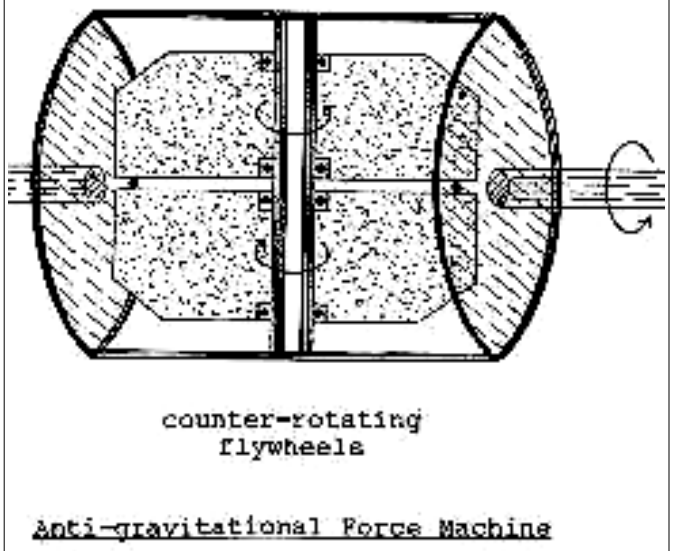


Fig. 11 An improved streptating flywheel design.

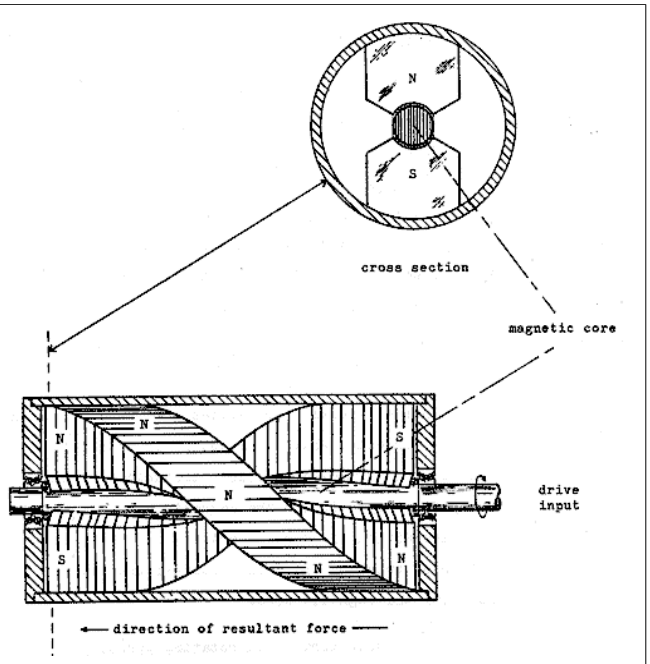


Fig. 12 A magnetic Linear Force Machine.

Since the thrust is proportional to the product of the spin rates squared, a mechanism can be designed to maximize thrust by maximizing both ω_s and ω_p, within material stress limits. A design that mounts the counter-rotating flywheels co-axially so they directly face each other for transmission of opposing forces[p54], Fig. 11, would overcome the fragile arrangement of Fig. 8.

Magnetic LFM, Plasma Containment and UFO Propulsion

An alternative version of the mechanical flywheel force machine used a continuously rotating rod or core, made of magnetic material, suspended within an ingenious helical magnet arrangement[a81,82], Fig. 12. The magnetic field must be strong enough to saturate the core, thus eliminating hysteresis effects. The magnetic gap is twisted so that, in rotation, the magnetic dipoles within the core material are both twisted and translated, i.e., streptated.

This overcame the limited precession rate of the flywheel LFM as well as the pulsed delivery of thrust[a81]. It also indicated the thrust against space is achieved by distortion of the aether, by either mechanical streptation or magnetic streptation.

Furthermore, DePalma foresaw that a directed field of repulsion would be generated at one end of the magnetic LFM by aetheric distortion. With multiple LFMs aimed at a central point, this repulsive force could theoretically be used to bottle plasma, such as within a hot fusion reactor converting hydrogen into helium at extreme temperatures[a82,83].

Similarly, based on reports of UFO flight performance, DePalma envisioned vehicles propelled by variable inertia machinery, or force machines[p94]. A vehicle propelled via a torsion field can accelerate at rates that would be destructive to the crew, except that the field imparts inertial connectivity so that the vehicle and its contents are propelled as a whole[a97].

The Faraday Disc

In December 1831, Faraday discovered that a magnet cemented to a rotating copper disc generates an electrical potential between the axis and the rim[a57,70], Fig. 13. Because there is only a single component (a rotor), such a generator is known as "homopolar"[a11,40-42]. It is characterized by a low output voltage, usually no more than a few volts, and high direct current (DC) in the range of 1000's of amps, or kilo-amperes[a17,59,114].

The open-circuit voltage (no load present) produced by this arrangement is:

$$V = 0.5\omega_s B\,(r_2^2 - r_1^2) \qquad [5]$$

where V is the electrical potential (in volts), ω_s is the rotational speed (in radians per second), B is the magnetic flux density (in Tesla, 1 T = 10,000 Gauss), r_2 is the disc outer radius and r_1 the axle radius (in meters)[a16,114][h].

The same electrical potential also occurs if the magnet is not attached and remains stationary, but then there is inductive electromagnetic drag on the disc as it rotates. This drag effect is present in all conventional generators and electric motors today, which feature two components: a rotor and a stator in very close proximity[a41,74].

The advantage of the two component system is generation of high voltages, in either DC or alternating current (AC) form[a18]. This allows thin conductors for the same power output, compared with the low voltage and high current of the homopolar design. With the AC technology developed by Nikola Tesla[a85], voltage is easily transformed, making such an energy supply highly adaptable.

Finally, if the disc remains still and the magnet rotates, no electrical potential is generated in the disc, nor is there drag on the disc. To explain these effects, Faraday concluded that the magnetic lines of force of a magnet are not a property of the magnet **but of the space** the magnet occupies[a88,89,38,39].

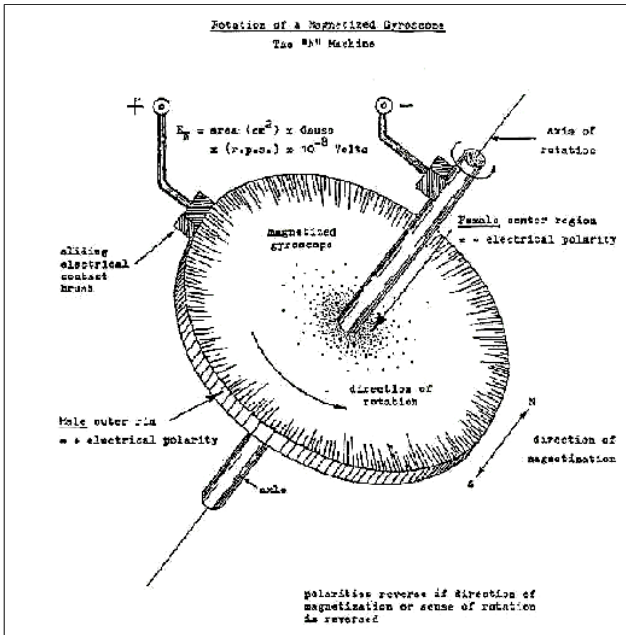


Fig. 13 A Faraday disc taps into aetheric energy.

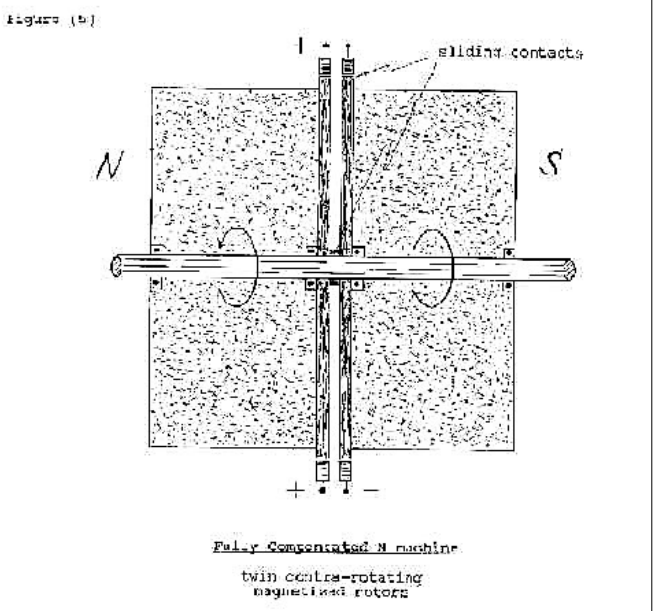


Fig. 14 Twin Faraday disc arrangement.

The N-Machine

A homopolar-type electrical generator, featuring a magnetized gyroscope and known as the N-Machine, was investigated by DePalma[a14-20]. The "N" refers to N-space or hyperspace, where the number of dimensions is N = 4 or more. Replicating the discovery of Faraday, he found over-unity performance was possible by avoiding the inductive drag of conventional generators[a16,88,91]. It is well known among electrical engineers that the mechanical input required to overcome such drag always reduces efficiency to less than 100 percent[a16,37,41].

The choice of liquid metal contacts to transfer the large electrical current from the rotor also helps to minimize mechanical drag, compared with solid graphite or copper-graphite brushes[a90].

Over the years, DePalma considered a number of different designs. An elegant arrangement that doubles the output of a single Faraday-type disc is shown in Fig. 14. By counter-rotating two co-axial discs, the voltages add, stray magnetic field effects are compensated and power output is increased[a55]. Other arrangements include a disc with a spiral conductor[a59], Fig. 15, and stacked magnets either side of the disc[a15,88], Fig. 16. The spiral experiment was part of an effort to harness the stray magnetic fields that otherwise limit power output. The stacked magnets helped to "saturate" the magnetic circuit, thus maximize the extracted power[a17].

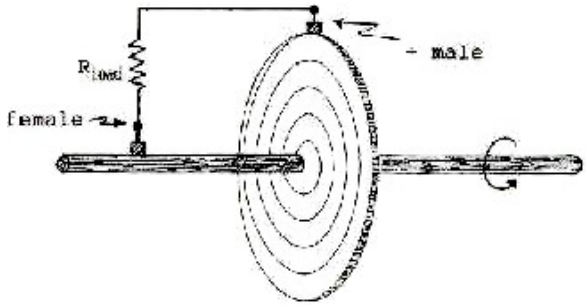


Fig. 15 A Faraday disc with spiral conductor.

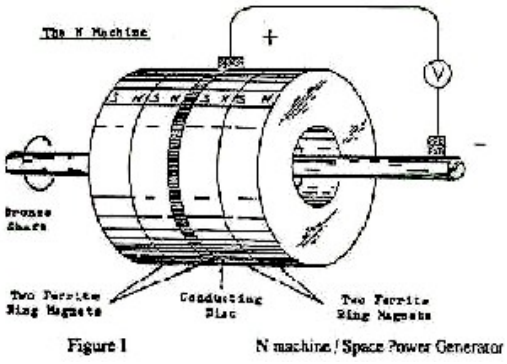


Fig. 16 Faraday disc with magnets on 2 sides.

In 1978, DePalma completed construction of the Sunburst homopolar generator in Santa Barbara, California[a7,90]. This first N-Machine was independently tested by Dr. Robert Kincheloe[a10,90,102], professor emeritus of electrical engineering at Stanford University. In his 1986 report[e], Kincheloe noted that the drag of the rotating magnetized gyroscope was only 13 to 20 percent of a conventional generator. This translates to an over-unity efficiency in the range of 500% to 770%[a50,90].

In 1991, DePalma published a peer-reviewed article[a88][f], *Magnetism as a Distortion of a Pre-Existent Primordial Energy Field and the Possibility of Extraction of Electrical Energy Directly from Space*. This marked the 19th year since the spinning ball experiment, indicating the time required for DePalma's unconventional ideas to be allowed into mainstream engineering discussions.

In 1995, DePalma filed world patent WO 95/08210 for a Quadrapole N-Machine[g], Fig. 17 (also Fig. 21). If operated at sufficiently high speed, it would be expected to function as an over-unity generator.

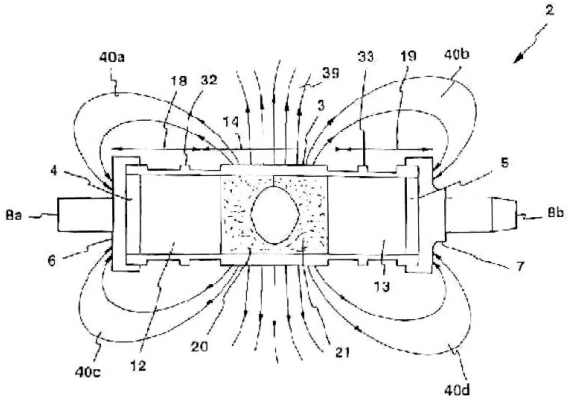


Fig. 17 DePalma's patented Quadrapole homopolar-type generator.

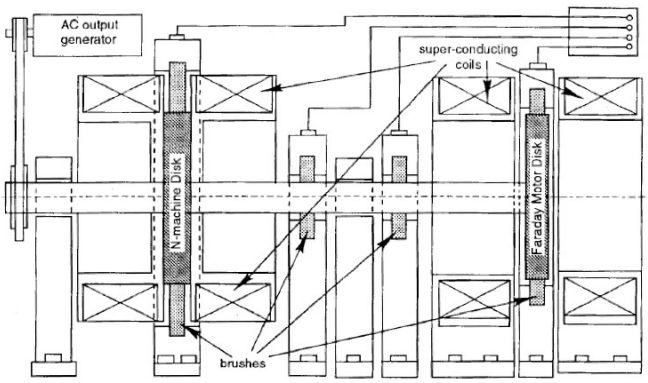


Fig. 18 Dr. Inomata's JPI-2 over-unity generating device.

Works of Inomata and Tewari

Inspired by DePalma's work on the N-Machine and description of a self-sustaining device[a17], Japanese investigator Dr. Shiuji Inomata proposed a self-contained over-unity device called the JPI-II (the JPI-2), Fig. 18. Based on lessons learned from building the Japan Psychotronics Institute JPI-1 device, it would feature superconducting electromagnets for both a Faraday motor and a Faraday generator, with a shaft output driving a conventional AC generator. It was projected to produce up to 200 kW electrical output with little-to-no external input[h], Figs 19 and 20.

Since 1978, a senior engineer with India's Department of Atomic Energy-Nuclear Power Corporation, Paramahamsa Tewari, developed the Space Power Generator (SPG). It replicated DePalma's N-Machine and produced 1.5 kW total output (electrical + heat) for each 1 kW input (electrical)[i123]. The net electrical output would have been about 600 watts if permanent magnets were used instead of electromagnets. Even better efficiency would be obtained by using nearly frictionless liquid metal electrical contacts instead of solid brushes. The SPG was patented in India in 1994[j].

In his book *Beyond Matter*[i], Tewari postulated his Space Vortex Theory (SVT) whereby space is filled with a dynamic medium, whose swirling motion is the source of all matter and energy. Tewari's theory is based on the assumption that the electron has a vortex structure within the superfluid aether, and is not just a homogeneous "droplet of charge." He posited that a void lies at the heart of the electron, whose high speed rotation within a vacuum could produce energy from space.

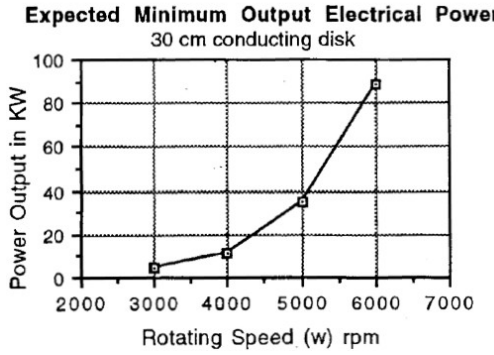


Fig. 19 Projected performance of a 30 cm rotor.

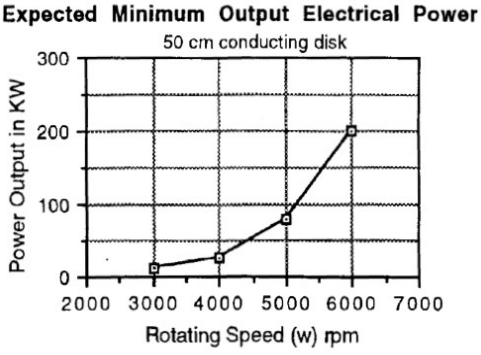


Fig. 19 Projected performance of a 50 cm rotor.

N-Machine Applications

The homopolar generator typically produces low voltage (0.03 to about 30 volts) and high direct current output (kilo-ampere level). The high current causes strong magnetic fields within the generator, which can limit the power production. As an indication of how strong the fields are, Fig. 21 shows a wrench magnetically attracted to an output conductor with sufficient force to be held in place by friction.

To overcome such effects, various means of compensating are used to partially cancel the fields, notably special conductive pathways that provide shielding[a50,55], Fig. 22.

Fig. 21 A wrench magnetically captured by a conductor carrying high current.

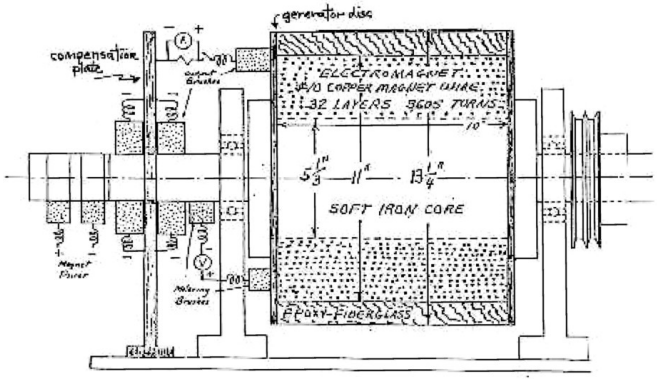


Fig. 22 Sunburst N-Machine with magnetic field compensation plate.

A number of important industrial processes[a105] rely on low DC voltage and high current electrical power, hence are amenable to the supply of a homopolar generator, for example:

1) arc welding
2) spot welding
3) electroplating
4) electrolysis
5) aluminum smelting

Hoagland's Commentary

Discussing the work of DePalma, Richard C. Hoagland reported, "*DePalma realized that the spinning ball was not about anti-gravity at all. That, instead, it represented a unique window into a far deeper reality ... re: the very energy structure of space and time itself and the extraordinary possibilities of extracting that unlimited, free energy via a variety of appropriate technologies.*"

One of the on-going discussions (abruptly cut short by Bruce's tragic and untimely death, on 2 October 1997) was a resolution of exactly where this free space energy was coming from. Hoagland added, "*It is not really coming from 3-Space at all—but literally from a higher dimensional reality, made available in this dimension as a propagating torsion field distortion.*"[k]

In light of these and other observations, Hoagland coined the term "Hyper-Dimensional Torsion Field Physics", or simply "HD Physics".

Hoagland's Research

Former NASA consultant on Apollo, science advisor to Walter Cronkite and independent researcher Richard C. Hoagland has studied all of the various space agency missions within the solar system. The cumulative photographic evidence over many decades has revealed the remnants of previous civilizations, including their advanced technology based on HD physics[l][m].

From the early 1980's, the numerous pyramids within the Martian Cydonia complex of ancient structures alerted Hoagland to tetrahedral geometry as the key to HD physics, Fig. 23. The tetrahedron is the simplest of the 5 Platonic Solids, a group of regular 3D geometries made purely of regular 3-, or 4- or 5-sided polygons[m94]. It is considered to represent a projection or transfer from higher dimensions into 3D reality[m110,111].

The angle $\sin^{-1}(1/3) \approx 19.5$ degrees is redundantly expressed at Cydonia. It is the latitude where the vertices of a regular tetrahedron touch a circumscribing sphere, Fig. 24, with one vertex at the pole[m155].

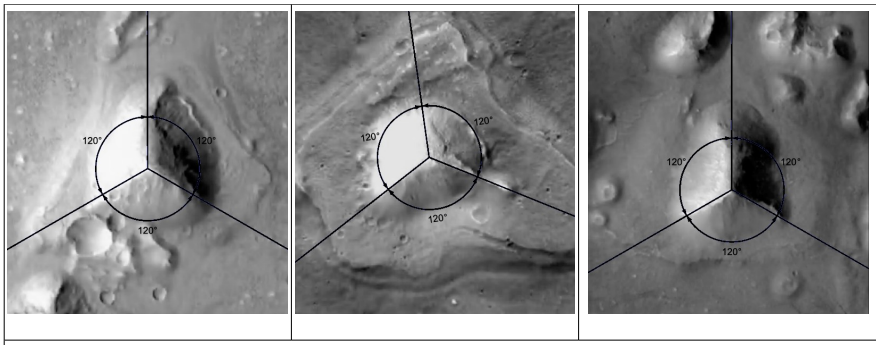


Fig. 23 Tetrahedral pyramids in the Cydonia region of Mars. Note the exact alignments with the 120 degree sectors.

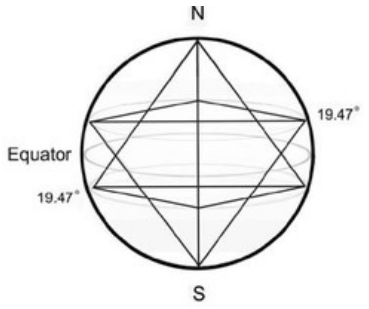


Fig. 24 Tetrahedra vertices touch a sphere at 19.5 degree latitudes.

Inspection of the major bodies in the solar system[m106][n][o] shows that previously unexplained energy upwellings occur at this latitude, for example the volcanos at Maunakea, Hawaii, on Earth and at the volcano Olympus Mons on Mars, Figs 25 and 26. The Red Spot storm on Jupiter, the Great Dark Spot on Neptune and the sunspot bands on the sun also lie close to 19.5 degree latitudes, Figs 27, 28 and 29.

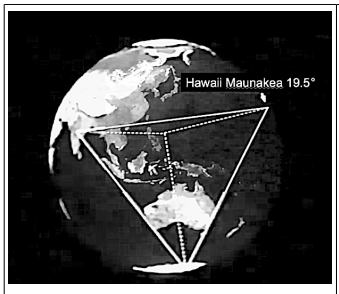


Fig. 25 Maunakea, Hawaii, at 19.5° north.

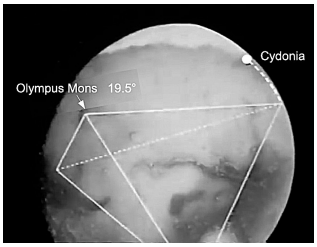


Fig. 26 Olympus Mons on Mars at 19.5° north.

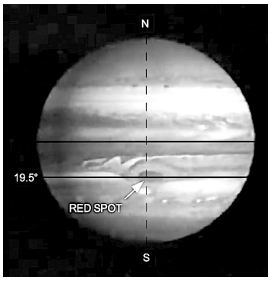


Fig. 27 Jupiter Red Spot at 19.5° south.

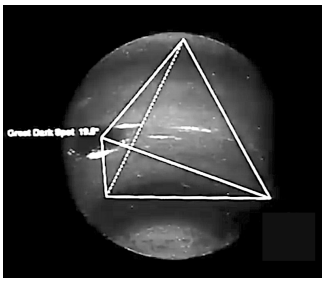


Fig. 28 Neptune dark spot at 19.5° south.

Furthermore, a pair of interlocked tetrahedra viewed from above appear as a hexagonal star, Fig. 30. The opposing twin centermost parts of this 3D hexagonal pattern are projected into the clouds at the north polar region of Saturn, Fig. 31. Scientists have puzzled at the fact the polar winds near 70.5

degrees latitude (19.5 degrees from the pole) make such sharp turns[m455].

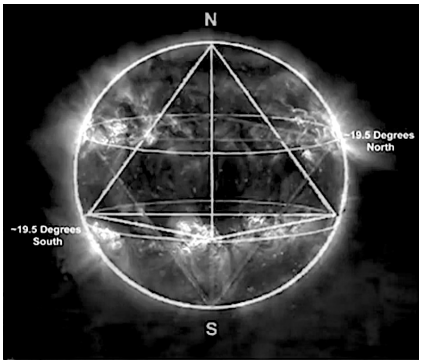


Fig. 29 Sunspot bands at ±19.5° (x-ray image).

Fig. 30 Interlocked double tetrahedra viewed from above.

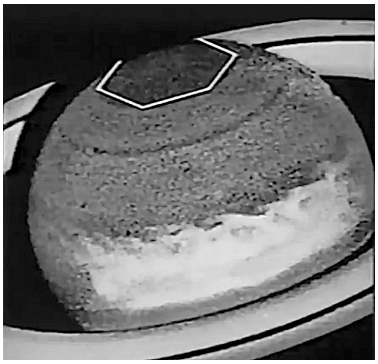


Fig. 31 Saturn north pole hexagonal cloud pattern.

In our solar system, it is noted that the outer gas giant planets all emit much more energy than they receive from the sun. The sun also emits much more energy than can be explained by nuclear fusion (the Bethe-Weizsäcker cycle[x3,6]). The source of this extra energy, known as "luminosity", has eluded identification by mainstream physics theories. However, it is proportional to the angular momentum of each object plus its satellite bodies[m130,157], Fig. 32, which indicates a torsion field or hyperspace energy source. By this measure, the higher-than-expected solar emission points to the existence of more planetary bodies that have yet to be discovered.

Another inexplicable (to mainstream astrophysics) observation is the tetrahedral "X" light pattern projected from a dying star, Fig. 33. A transparent tetrahedron inside a cube appears as an X inside a projected square when viewed from a particular angle, Fig. 34. Furthermore, DePalma linked the effect of the torsion field to observed anomalous red-shifting of quasar signals[a95].

While conventional physics is unable to explain these tetrahedral-based phenomena, the hyperdimensional energetics of spinning objects with both magnetic and gravitational fields does shed light on the processes involved.

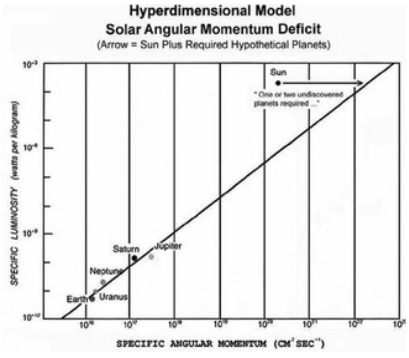


Fig. 32 Excess energy emitted by the planets and sun.

Fig. 33 Tetrahedral "X" pattern projected by a dying star.

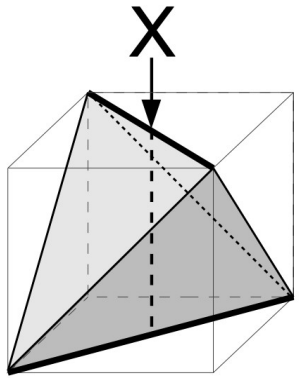


Fig. 34 A tetrahedron seen edge-on is a boxed "X".

Eclipses and Sacred Sites

Hoagland obtained a series of measurements with a portable Accutron-based torsion field detector, Fig. 35, inspired by the 1970's experiments of DePalma. The data from Hoagland's experiments are available to subscribers on the Enterprise Mission and The Other Side of Midnight websites[p]. Beginning in the early 2000's, the torsion activity of eclipses was recorded, Fig. 36. The Accutron data confirmed the anomalous torsion field effects of an eclipse on the behaviour of Foucault pendula[q], documented since 1954 and known as the "Allais effect". The latter has been observed deep underground on multiple occasions, indicating torsion effects can easily penetrate planetary materials.

Far beyond energy infrastructure considerations, or aspects of planetary and stellar dynamics, torsion field physics has been found to have spiritual or psychological aspects affecting human consciousness. Accutron measurements were taken at ancient sacred sites worldwide, indicating the geometries of structures such as pyramids amplify or modulate the background torsion field, Fig. 37.

A side-effect can be the emission of a vertical laser-like beam of light from a pyramid, Fig. 38, possibly triggered by local thunderstorm activity (at Kukulkan). A second photo, showing the children, was taken by their father, who immediately noticed the unusual phenomenon[r].

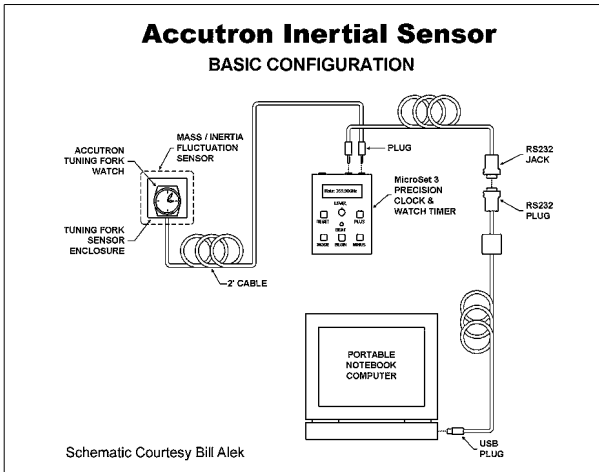


Fig. 35 Portable Accutron torsion sensor.

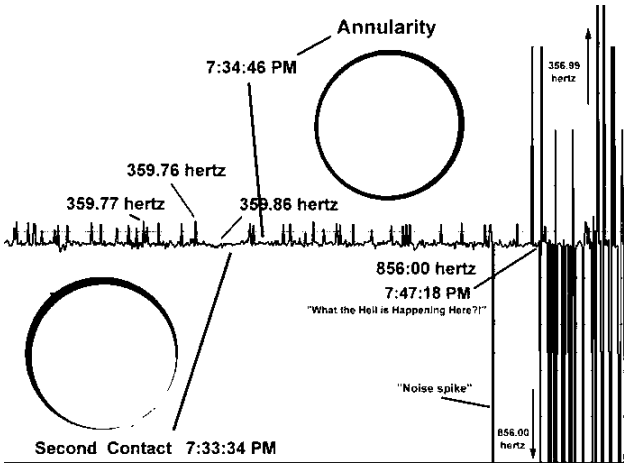


Fig. 36 Sandia eclipse (2012) torsion field data.

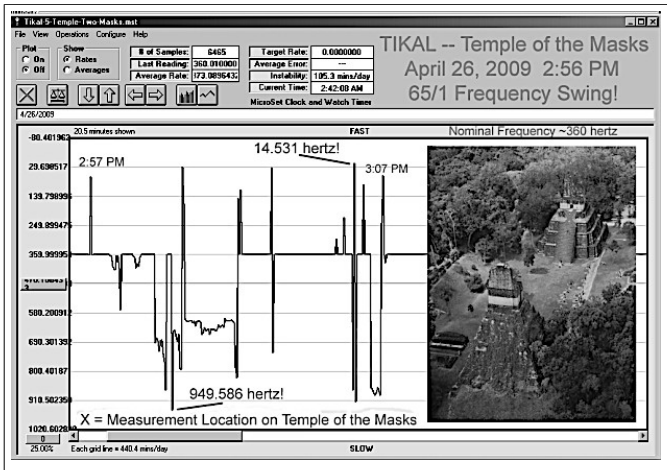


Fig. 37 Teotihuacan (2009) torsion field data.

Fig. 38 Energy beam at Kukulkan (2009).

Chemical and Nuclear Effects

In a number of podcast shows of The Other Side of Midnight[p], Hoagland has referred to evidence that torsion fields affect the speed of chemical reactions and even nuclear reactions. The latter would explain why nuclear weapon test yields have been wildly unpredictable, varying as much as an order of magnitude either side of an expected megatonnage. The planetary alignments apparently influenced the underlying torsion physics to cause such variations. Similar claims have been published in mainstream sources based on correlations of radioactive decay rates with solar events[s][t].

Relating to the cold fusion phenomenon first reported in 1989 by Pons and Fleishmann, torsion physics would explain the release of energy from transmutation of elements at room temperature. Author Emidio Laureti explains[u], "*By the means of a macroscopic structure, which reproduces homopolar induction, it is defined a form of interaction which might offer an hypothesis of atomic models, for a possible explanation of cold fusion energy*".

Hutchison Experiments

Canadian experimentalist John Hutchison acquired some 22 tons of electric and electronic gear salvaged from Canadian Navy vessels[v#76] and packed them into his modest Vancouver apartment, Figs 39 and 40. Drawing up to 4,000 watts of power[v#18], he used that equipment to replicate some of Nikola Tesla's pioneering work[v#4]. He was able to demonstrate effects such as levitation, Fig. 41, turning metal into gel, Fig. 42 and disintegration of material, Fig. 43. Several hours of his videotaped experiments are available on the Internet[x][y][z][aa].

Fig. 39 John Hutchison and radio equipment.

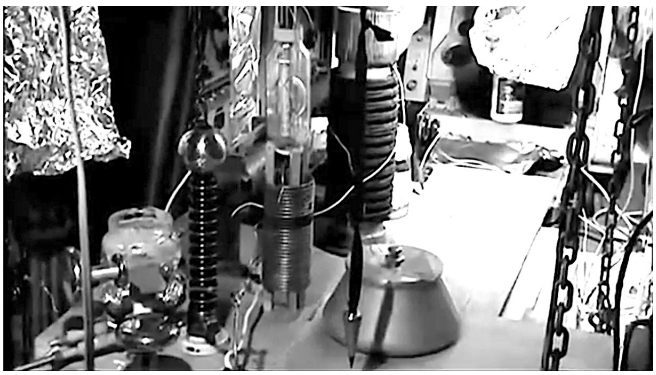


Fig. 40 High voltage Klystron tube + equipment.

These effects can be explained by the modification of material properties by the special fields generated by Hutchison's equipment. A high voltage electrostatic field was produced locally by means of Tesla coils and/or a Van de Graaff generator. In addition, powerful multi-megahertz radio frequencies were superimposed and phase shifted by means of a special phase wheel, which is necessary to produce swirling fields.

Under these conditions, the Magnetic LFM “space drive” effect documented by DePalma appeared to operate. From Eqn [3], the od number $N_{od} = K\omega_s^2\omega_p^2 + 1$. With rotational ω_s and/or precession ω_p rates in the millions of radians per second, N_{od} could theoretically be in the trillions. From DePalma's data, Eqn [4], levitation would be predicted if $N_{od} > 1{,}000$, which would be possible even with very weak paramagnetic material properties (small K values).

Fig. 41 Levitating liquid.

Fig. 42 Gelified metal.

Fig. 43 Disintegrated material.

The largest object levitated by Hutchison was reported to be about 1500 pounds (680 kg)[v#17].

In addition, the electrostatic and torsion field effects were apparently sufficiently powerful to alter the material properties of metal, causing temporary gelification and even disintegration[v20,21 of 31]. While further experiments must be performed to quantify the physics involved, torsion fields would appear to provide the "extra" influence to explain these anomalous results demonstrated by Hutchison.

Kozyrev's Telescope Experiments

From recreations of the independent research of Nikolai Kozyrev in Russia, the resistance of a single 100,000 Ohm metal film resistor measurably changed when subjected to the torsion field of a nearby star (spinning celestial mass) seen through a reflecting telescope[ab16-24][ac20], Fig. 44. The resistor was part of a balanced Wheatstone bridge, allowing sensitive measurement of the torsion influence, Fig. 45. The precise position of the star was located by sweeping the telescope in a tight computer-controlled search pattern and noting when a spike in resistance or "hit" occurred, Figs 46 and 47.

Fig. 44 Celestron 8" telescope and electronics.

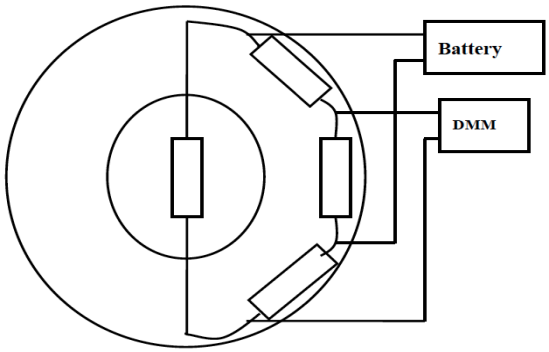


Fig. 45 Wheatstone bridge as a resistor sensor.

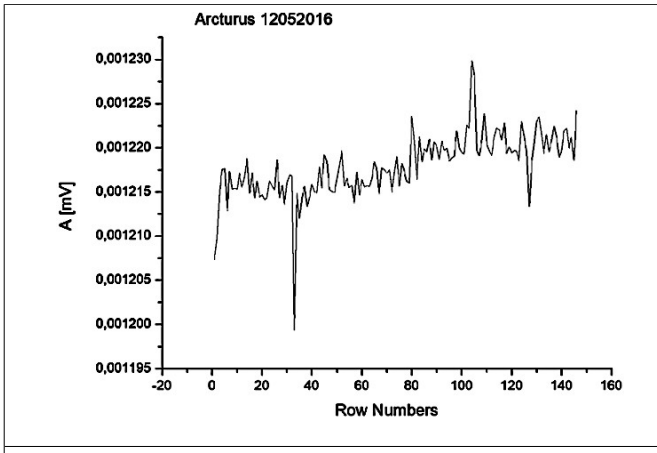


Fig. 46 Bridge voltage vs scan position, Arcturus.

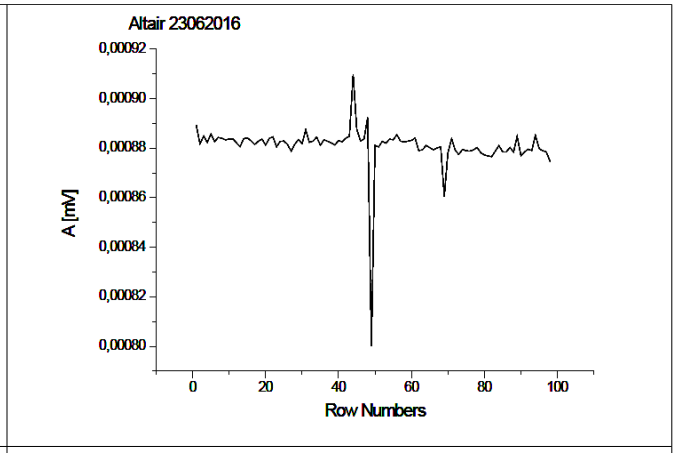


Fig. 47 Bridge voltage vs scan position, Altair.

Kozyrev found that torsion energy behaves somewhat as light, which can be reflected from a metal-coated telescope mirror and concentrated. Unlike light, torsion energy does not refract as it passes through a glass lens. About 50 percent of the incoming torsion energy can pass through a metal cover placed over the telescope, with the rest apparently being reflected or absorbed[ab19]. This is consistent with the observations of DePalma, where the torsion field penetrated the magnetic shielding of both the flywheel (plus drive motor) and the Accutron watch[a44].

An interesting observation related to time travel was made when the telescope was aimed at the present and future sky positions of the same star. The light seen by an observer on Earth has taken years to cross the vast distances of space, meaning we only see its position in the past. In the meantime, the star has moved some distance around the galaxy. This is known as “proper motion” and published values are available to astronomers. Using this data, Kozyrev found the torsion field “hit” existed for all 3 positions of the star – past, present and future[ab17].

Similar measurements were made of the sun, which is actually about 2 degrees ahead of the visible position as seen from Earth. This is because the light emitted by the sun takes about 8 minutes to travel 150 million kilometers and arrive at Earth. At an equal time in the future, the sun's position will be 4 degrees ahead of the visible position. Confirmation of the triple positions was also obtained for planets of the solar system.

Psychic Experiments

In other recreations of Kozyrev's research circa 1990, increased psychic abilities of subjects placed in mirrored spirals, cylinders or other geometric enclosures was reported[ac], Fig. 48. The metal mirrored walls, known as Kozyrev mirrors, were an attempt to trap torsion energy by reflecting it. Some experiments also featured chambers with reduced magnetic field strengths (hypo-magnetic), diminishing or cancelling the Earth's natural field[ac29,62]. Such shielding from electromagnetic influences improved psychic sensitivity, indicating EM energy effectively constitutes background noise. Use was made of an interlocked double polyhedral model, apparently aligned with Earth's axis. As noted by Hoagland, such geometries are known to increase the background torsion field strength. In turn, this affects chemical reactions and the human nervous system[a95][ac134], as noted by DePalma.

Furthermore, the location of one group of participants was in the Arctic, at about 73 degrees latitude[ac131] (17 degrees from the north pole). Along with the crystal structures of various minerals and even the surrounding ice and snow, the local torsion field would be enhanced in a similar way as seen with Saturn's north pole.

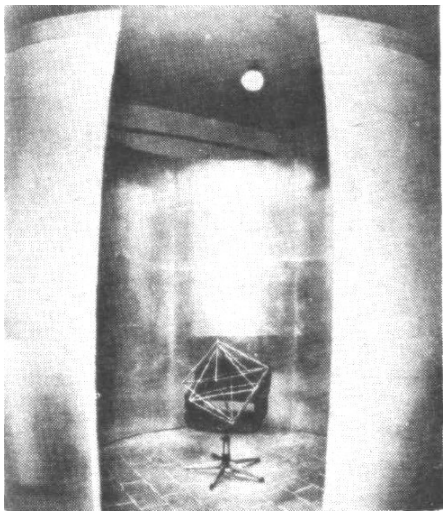
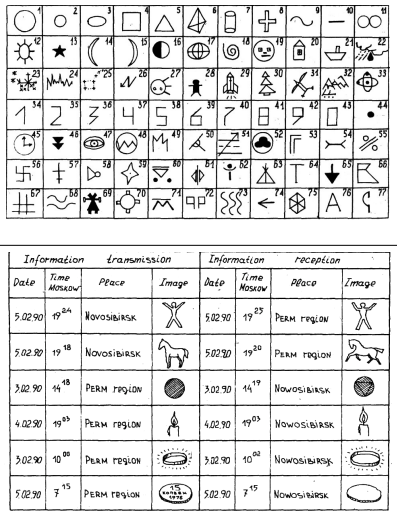


Fig. 48 Mirrored chamber and polyhedra for psychic experiments.



Information transmission				Information reception			
Date	Time Moscow	Place	Image	Date	Time Moscow	Place	Image
5.02.90	19^{24}	Novosibirsk		5.02.90	19^{23}	Perm region	
5.02.90	19^{18}	Novosibirsk		5.02.90	19^{20}	Perm region	
3.02.90	14^{18}	Perm region		3.02.90	14^{19}	Nowosibirsk	
4.02.90	19^{35}	Perm region		4.02.90	19^{03}	Nowosibirsk	
3.02.90	10^{00}	Perm region		3.02.90	10^{02}	Nowosibirsk	
5.02.90	7^{15}	Perm region		5.02.90	7^{15}	Nowosibirsk	

Fig. 49 Samples of graphical patterns sent via thoughts.

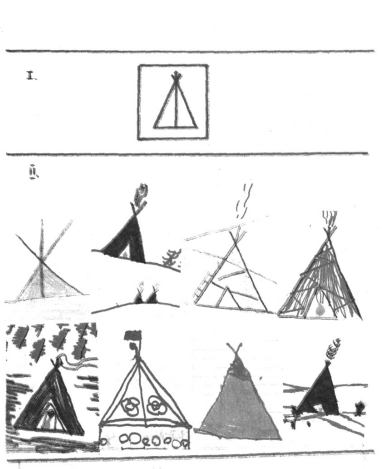


Fig. 50 Received pattern #63 recorded by children age 4-12.

Controlled experiments in 15 countries[ac133] showed a remarkable ability of the participants to send and receive graphical patterns over thousands of kilometers by means of thought projection (or "distant-image-bearing communication"[ac85]), Figs 49 and 50. Correlations were made between successful thought transmission and the presence of magnetic storms (aurorae) and solar eclipses[ac106,107], which were beneficial to the transmitting party. The researchers described the medium of transfer as the "informational field of the Earth"[ac102], corresponding to the torsion field since EM energy is evidently background noise to a receiving party[ac110 Fig 29]. The ability to see into the future[ad] and reliably predict events, such as earthquakes, by means of Kozyrev mirrors has since been documented[ae][af]. This appears to be related to the backwards time travel of torsion influences observed with the star position experiment.

Points of Understanding

In light of the currently available observations and experimental data, the following statements appear to be correct:

1) A torsion field (or od field) is generated by rotation of an object and by forced precession
2) The period and swinging behaviour of a pendulum are affected by spinning the bob
3) Precession of a Foucault pendulum responds to torsional influences during eclipse events
4) Torsion field strength can be quantified and recorded using an Accutron-type apparatus
5) A spinning object/gyroscope gains inertia compared with its non-rotating state
   i.e., the od number N_{od} = (inertial mass)/(gravitational mass) > 1
6) The field strength is proportional to the mass *m* and radial distance *r* of a spinning object
7) The field strength is proportional to spin rate squared, ω_s^2
8) The torsion field imparts extra inertia to objects placed near the spin axis or pole
9) The field reduces the inertia of objects placed near the spin equator or flywheel rim
10) Streptation of counter-rotating gyroscopes or a magnetic field produces a "space-drive" thrust
11) Hyperspace can provide a reaction force without need for a reacting object in 3D reality
12) The "space-drive" effect entrains a UFO crew, protecting them from extreme accelerations
13) The torsion field is due to distortion of hyperspace, as are electricity, magnetism and gravity
14) Hyperspace, or the Primordial Energy Field or aether, exists in at least 4 dimensions
15) Hyperspace contains energy that can be accessed in 3D reality by means of torsional stresses

16) The magnetized spinning Faraday disc enables access to Primordial energy in electrical form
17) Celestial bodies exhibit energy upwellings from hyperspace at tetrahedral 19.5° locations
18) The torsion field has an effect on the speed of chemical and nuclear reactions
19) Electronic oscillators slow down and resistance of a resistor increases in a torsion field
20) Objects can be levitated by phased electromagnetic frequencies in a strong electrostatic field
21) Similar EM frequencies with torsion can temporarily turn metal into gel, or disintegrate material
22) Torsion energy can penetrate a metal sheet, with about half being reflected
23) Torsion energy does not refract when passing through glass
24) Torsion effects travel both forward and backward in time at light speed and also instantaneously
25) Geometric structures such as pyramids, spirals and cylinders concentrate the local torsion field
26) Increased psychic abilities in humans are associated with concentrated torsion fields
27) Earth's "informational" or torsion field can relay information across vast distances and time
28) Remote viewing of past or future events, such as earthquakes, is possible using Kozyrev mirrors

Brief video presentations by the author are available on the Internet[ag], including more HD physics material.

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The range of effects associated with torsion field physics is much wider than can be summarized in this short article. Further reading from the following references is recommended to obtain a fuller picture.

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